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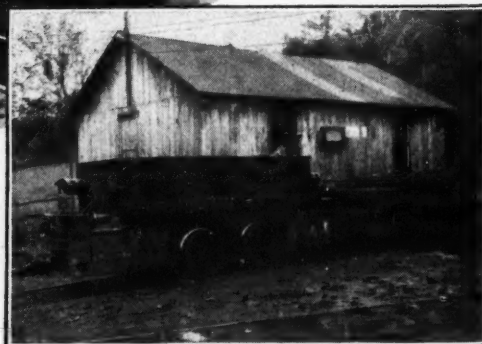
You know what it means to have your motors on the job throughout a busy shift. Two things you'll notice about Exide-Ironclad Batteries. First, they are so rugged that they hardly ever lose any time out of service for repairs. Second, that their power and speed hold up well right down to the last trip of the day.



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With which is consolidated "The Colliery Engineer" and "Mines and Minerals"
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Modern Devices Speed Operation and Assure Safety	457
By J. H. EDWARDS.	
Changing Mining Methods to Increase Production	461
By SCOTT DU PONT.	
Timber Preservation Yields Encouraging Result	464
By F. T. BAKER.	
Sees Interests of Miners' Union, Operators and Public Promoted by Early Agreement on Wage Pact	472
By PAUL WOOTON.	
Politics Again Blocks Peace Plans in Strike of British Coal Miners; Government Stands Pat on Offer	473
Western Governors Seek State Control of Mineral Resources on Public Lands; Smith Defends Leasing of Coal and Oil	474
By A. H. HUBBELL.	
Ohio Operators Stick to Jacksonville Scale	472
Hampton Roads Dumpings Fall Below August Record	472
Merger of Dock Interests on Upper Lakes Indicated as Coal Officials Confer	473
Trade Commission Fishing Gets Setback	476
Fourth Coronado Coal Co. Trial Impends	476
Thompson Ends Long Term on Trade Commission	476
Ames and Vincent Resign; Duncan Succeeds Latter	476
Editorials	455
Practical Pointers	469
News Items from Field and Trade	477
Traffic News	480
Weekly Review and the Market	481
Foreign Market and Export News	486
New Equipment	487

McGRAW-HILL PUBLISHING COMPANY, INC.

Tenth Avenue at 36th Street, NEW YORK, N. Y.
Cable Address: "Machinist, N. Y."
WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, 16th and Parkway
CLEVELAND, Guardian Building
ST. LOUIS, Star Building
SAN FRANCISCO, 833 Mission Street
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Publishers of	
Coal Age	Engineering and Mining Journal
Engineering News-Record	American Machinist
Power	Chemical and Metallurgical Engineering
Ingeniería Internacional	Radio Retailing
Bus Transportation	Electric Railway Journal
Electrical World	Electrical Merchandising
Industrial Engineer	Successful Methods
Journal of Electricity	
(Published in San Francisco)	
American Machinist—European Edition	
(Published in London)	

Copyright, 1926
By McGraw-Hill Publishing Company, Inc.
Published weekly
Entered as second-class matter Oct. 14, 1911, at the Post Office at New York, N. Y., under the Act of March 3, 1879.
Printed in U. S. A.
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.
Number of copies printed this issue, 10,250

Uncovering Coal with a Dragline Excavator

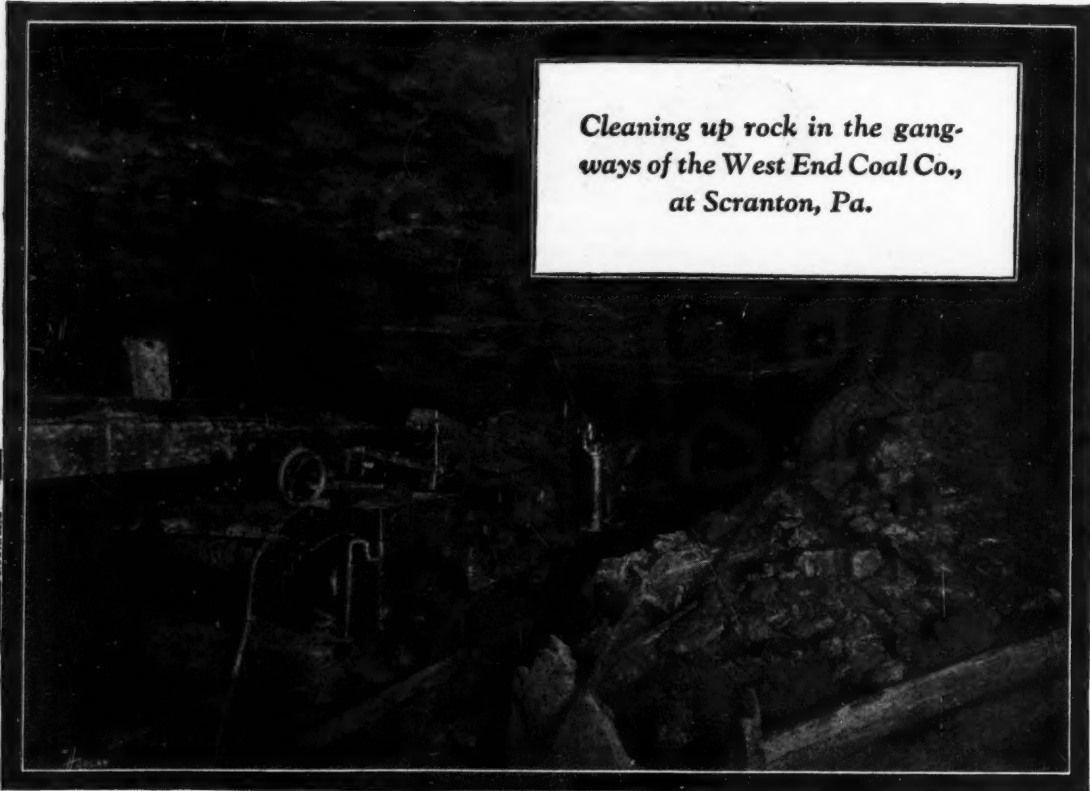
Stripping is always an interesting mining process, probably because it is all conducted in the light of day and may be readily seen from start to finish. Heretofore most such work has been done by power shovels, the dragline excavator being much of an oddity in this field. Next week Frank H. Kneeland will describe the open-cut operations of the United Electric Coal Companies at Farmersburg, Ind., where a giant excavator is opening a box cut over a mile long, and dumping 6 cu.yd. of soil at a time as much as 300 ft. horizontally from the point where nature placed it. This machine is caterpillar-mounted, and little time is lost in "moving up."

Slow-Speed Motors Show Best Results

Next week also J. H. Edwards will describe the tests that induced the management of New Orient to cut down the maximum speed of its gathering locomotives from approximately 7 to 3½ miles per hour. This was done only after it had been thoroughly demonstrated that the results obtainable fully justified the change.

Center Shearing Discussed

To secure as large a percentage of lump as possible is the desire of most coal producers. During the recent session of the Rocky Mountain Coal Mining Institute, John H. Emrick discussed the possibilities of center shearing as a means to this end. His paper, which will appear in our next issue, treats this subject from several angles and shows the strong influence that local conditions may exert on the results realized.



Cleaning up rock in the gang-ways of the West End Coal Co., at Scranton, Pa.

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Devoted to the Operating, Technical and Business
Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

Volume 30

NEW YORK, SEPTEMBER 30, 1926

Number 14

Why Put Coal Mining in a Class by Itself?

AT THE RECENT Denver meeting the Director of the U. S. Geological Survey admitted that he puts coal in one and metal in another, and totally different, category as to regulation.

One reason the Director alleges for his willingness to have coal more drastically regulated than other minerals, excluding oil, is that to operate a coal mine requires large capital, whereas a metal mine can be worked by an operator with small funds. Mr. Smith has often stated that a small coal mine cannot be operated profitably and economically. One wonders, if this be true, why there are so many small coal banks, and why Montana, with only nine large mines, has 273 small ones. The reason is that these small mines serve a useful purpose, are profitable in most cases, and furnish work to farmers in otherwise idle seasons. They are near their market, they have little overhead, and, being near the outcrop, they have no haulage or ventilation problems. These conditions change only when they become large operations.

True, great economies can be obtained in a big mine by the installation of machinery, but that is true also in metal mines. The small metal mine may be more prodigal of labor and material than any coal mine. The ore and the supplies are in some cases transported long distances by burros, and primitive methods are used underground and at the mill, if there is a mill, so that a low extraction of metal results.

There are also large metal mines whose operation would be inconceivable without the most modern and efficient methods. Thus large and small mines are to be found in both industries, but small coal mines have in some districts a peculiar right to existence. They serve restricted markets—farming communities, lime kilns and brickworks.

Why No Permissible Motor?

CIRCULAR No. 6012 of the U. S. Bureau of Mines, issued in August, 1926, shows that the Bureau has approved a considerable amount of motor-driven equipment. This includes two types of motor-driven air compressors, three loading machines, three coal drills, fifteen mining and shearing machines, one room hoist, two pumps, twelve gathering and one main-line haulage locomotive, and one power truck.

Naturally, perhaps, the question arises in the minds of mining men as to why no stationary motor has been declared permissible for use in gaseous atmospheres. Such a machine would unquestionably find many applications in mines, both gaseous and non-gaseous.

It is probable that the reason for this apparent lack of permissible equipment is two fold. In the first place, in all likelihood manufacturers have submitted complete equipments for test. Thus, a mining machine, for instance, would be submitted and tested, motor and all, as a unit and approval would be granted on the

same basis. Secondly, the Bureau may have preferred to test all elements composing any mining device conjointly. Such trial and approval would obviate the possibility of the various elements being employed separately—with possible danger to the mine and those employed therein. One manufacturer's representative recently complained bitterly that a certain type of motor had been approved as permissible when it drove a certain type and make of pump, but not otherwise.

When, as in the case cited, the two elements of a unit have no closer or more intimate connection with each other than a flange coupling it seems almost ridiculous that a motor is considered safe for use when driving one machine yet unsafe when driving another. The coal producers of the country are ready and anxious to secure safe equipment. Has not the time arrived when mining devices that are distinct from each other, even though they may be interdependent in operation, should be tested and approved upon their individual rather than their combined merits?

Employee Ownership in Industry

AT THE RECENT Congress of American Industry held in Philadelphia opinions differed much as to the advisability of arrangements whereby employees obtained a share in the profits of the industry which they served. For example, Charles A. Piez believed that control of industries by employees was an idea that was already in the discard and that the employee was not interested in stock dividends but only in his pay envelope—the control by strong individuals he believed was most practicable. On the other hand, T. E. Mitten, controlling the Philadelphia Rapid Transit Co., spoke strongly in favor of stock ownership by employees, and even of employee control. His opinion is the result of experiment and success in the conduct of the Philadelphia Rapid Transit Co., which controls the subways, surface lines, motor buses and even taxicabs of Philadelphia, with a valuation of \$500,000,000. The employees of this company, in consequence of the principle adopted in 1911, that savings through increased efficiency and service were to be divided between the management, the employees and the public, and that the employees' share would go into purchase of the company's stock, now hold over 220,000 out of a total of 600,000 shares; and as this is held in a block and voted by trustees, it was stated by Mr. Mitten to practically control the company. When Mr. Mitten took charge in 1910, the company could not meet its fixed charges, but now pays regular dividends upon its stock.

Mr. Mitten is fully convinced that the method could profitably be applied to other industries. He points out that the passage from an agricultural to an industrial America resulted in a nation where "a proletarian class predominates as to numbers, but where the wealth is concentrated in the hands of the comparative few." Whether or not the reader agrees with this summary,

he must be interested in Mr. Mitten's prescription for "a physical merger of capital and labor" . . . so that they have but one interest instead of two. . . . There can be no strikes then, because a man does not destroy that which is his own.

Mr. Mitten believes that his plan would work in the coal industry.

"Such a democracy in the anthracite industry would be intensely practical. The anthracite worker is a man of common sense, plus a common-school education. He will stop work and resort to passive resistance so long as he feels that he cannot otherwise force from the owners a fair share in his handiwork. He is not likely to stop work, however, when it not only stops his pay envelope but his dividend check also. Nor is he likely to increase his own wages beyond the power of the industry to pay, when the inevitable result would be to reduce his dividend payments, or see his own property deteriorate and go to smash.

"If the employees in the anthracite fields were offered an increase of wages in proportion to their future increased production, it is reasonably certain that a sufficient increase would be forthcoming, to compensate labor, capital, management and consumer. Even if this increase should justify but 10 per cent a year and this amount be invested in securities representing ownership, the men would in 10 years control the mines.

"A similar condition could be brought about in the bituminous coal industry in 15 years and it is safe to say that if the employee-ownership principle were applied to all industry, America would within one generation become a strike-proof nation, its democracy would be industrial as well as political, and the capitalistic system would not only have been humanized, but would have reached its maximum of usefulness in the advancement of human progress and civilization."

Change of Scenery

AFTER SCHOOL opens in the fall the average motorist takes some time to re-acustom himself to his former practice of noticing and obeying the caution signs erected near school properties. How much better it would be if the signs were taken down and stored during the vacation period! Their erection again in September would be definite notice for the exercise of caution.

The same applies to a certain extent to the safety signs in and about the mines. To all except new employees a sign remaining in the same place for many months or several years becomes a part of the scenery and not a thing to be read and observed.

There are a number of practical ways of combating this aging in the effectiveness of a sign. If it is painted on a mine portal or building, brightening it by repainting attracts attention. Better still is the practice of reproducing it with another color scheme. The small enameled signs can be changed at certain intervals to new locations, regrouped, or even taken down and put out of sight for a few months. While one sign is given a vacation, another to the same effect but differently worded and perhaps differently shaped can be put up.

The people of today are accustomed to variety. The same style will not serve for long. To be in keeping with the trend of the times, and to be effective, safety advertising at the mine, must be changed frequently. Only by that means will its attention value be retained.

Looking Further Afield

IF ALL THE MINES in Europe were wiped out, if all experimentation on that continent were to cease, the United States would suffer little technical loss, for indeed no European experience seems any longer to have much value in this country. America used to look to Europe for all its coal-mining lore. Today it goes along serenely with hardly a thought of European developments.

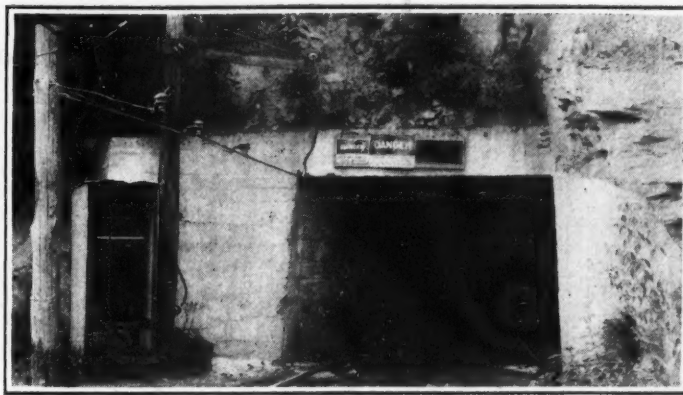
Just lately two washers have been introduced by the enterprise of certain American commercial interests. Had it not been for that activity it is likely they would have continued wholly foreign. Two shaking conveyors have been introduced, one by a commercial interest and one by enterprising operators. A prop puller has gained a foothold by the aggressive work of a foreign firm. Another American commercial concern has introduced from abroad a timber preservative. Several years back a screen and two types of breathing apparatus were introduced from Europe, the first by a commercial interest and the other two by the U. S. Bureau of Mines originally and later by the activity of American industrial companies. Perhaps by going back many years the list might be extended, but, at best, it is not by any means a long one.

However, one is prone to wonder if the foreign methods the United States has accepted represent all America should adopt. Is foreign experience and experimentation so lacking in value to American industry? Has America really culled all that is best and rejected only the unfit? Europe has taken much from America and seems anxious for more. One wonders, if after all, Europe is not more progressive in this matter than the United States.

Someone, for instance, might introduce the collapsible prop for use in longwall, a prop that will shorten a foot or more without breaking, that will let the roof bend or expand when it tries to do either without allowing the loosened material to come down and injure the workmen who must work around the foot of the post, one also that can be readily completely collapsed so as to permit of easy removal.

The various districts of the United States learn too little from one another. Each district sets up its own standards and abides by them. It is easier to imitate nearby mines than to learn from those more distant. In time, of course, the systems and equipment of one district spread their influence over others. The transference seems so sudden and spasmodic as to resemble that of an epidemic. Stripping, for instance, breaks out in some new district and soon the operators in that new area of infection are looking everywhere for suitable places for its introduction.

But the broad Atlantic is a wide gap to be bridged. Differences of conditions and language delay the progress of ideas and what is foreign seems to many of us likely to be ill suited to our needs. A little greater breadth of vision and a little more boldness of conception might prevent us getting behind in some elements of our practice. It seems hopeless, however, to discuss this matter, for the coal industry is not as active as it should be in welcoming practices which other native industries of a kindred character have adopted. There are big possibilities for operators and manufacturers who will look into other industries, districts and countries for the development of their technique or for new articles to build and market.



Modern Devices Speed Operation and Assure Safety

Automatic Substation Controlled by Telephone—Incline Hoist Effectively Safeguarded—Transfer Larry Remotely Driven — Reclosing Breakers Installed

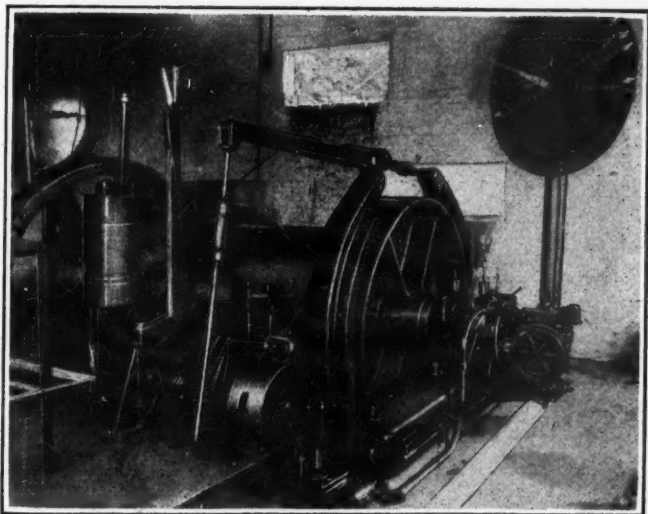
By J. H. Edwards

Associate Editor, *Coal Age*, Huntington, W. Va.

ANY DEVICE that saves labor, increases safety or raises the efficiency of men and equipment is almost certain to earn a satisfactory return on the investment. The Wolfpit operation of the McKinney Steel Co., in Pike County, Ky., is an excellent example of a mine where modern ideas and equipment are much in evidence.

The first indication that the equipment at this mine must be somewhat different from the average is encountered at the foot of the incline which leads from the town up to the drift openings on the side of the mountain. A large permanently-framed chart sets forth the signal code used in the operation of this

incline. This chart, together with a signal push button, bell and lamp, is mounted on a metal post. The permanency of the construction of this seemingly insignificant item, the signal post, and the use of audible as well as



Balanced-Hoist which Serves the Incline

At the right, below the indicator, is the Lilly controller that provides the same safety features as are common on shaft and slope hoists. The number of points marked on the dial of the indicator shows that this is a busy machine.

In the headpiece is shown at the left a view looking down along the main artery. This is the 30-in. steel pipe which chutes the coal down the mountain. The view at the right is taken from the bottom of the 1,700-ft. incline. The hoist house is near the top between the levels of the two beds worked. At the bottom of the landing stairs can be seen the post on which is mounted the signal bell, signal lamp, and chart of hoisting signals. In the center is shown the automatic-reclosing circuit breaker at the mine portal. Such instruments reduce the fire hazard and raise the overall efficiency of the electric system by cutting off the line any circuit in which trouble has developed.



Where the Coal Larry Is Used

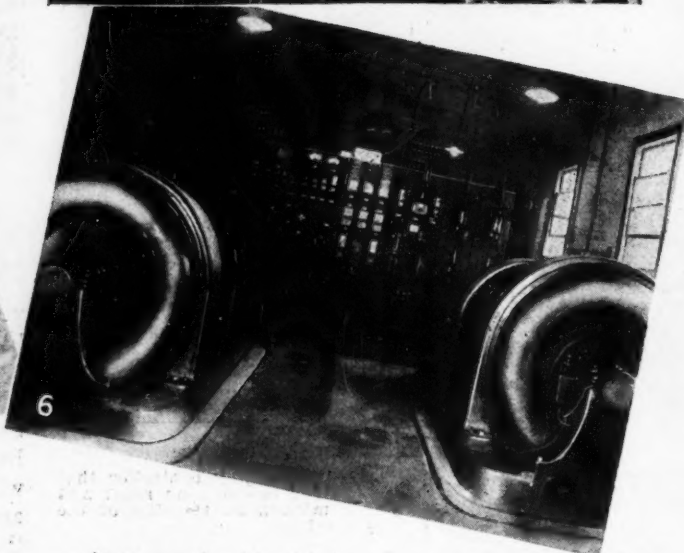
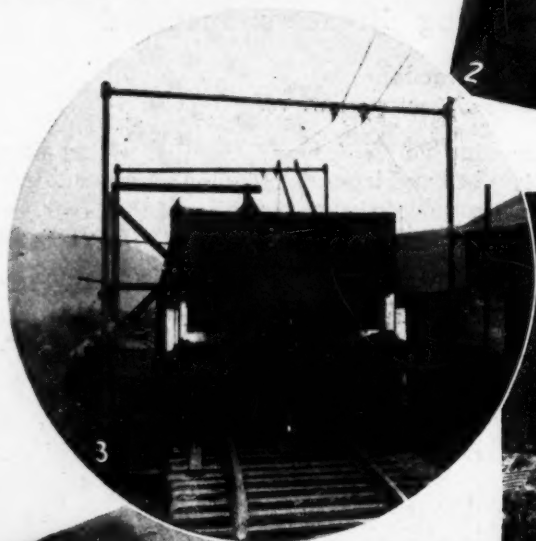
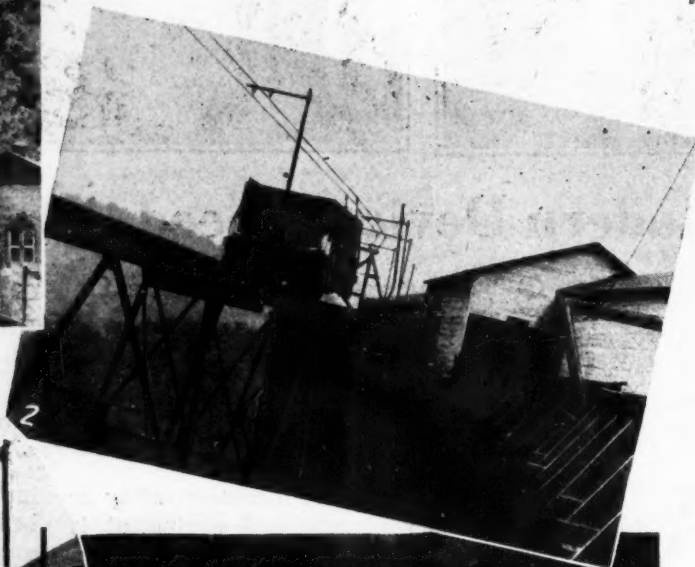
At the right, is the bottom of a pipe chute leading from the level of the upper to that of the lower bed. At the left is the dump house of the lower seam and the hopper and feeder of the main chute leading down to the railroad. The larry operates between these two points.

visual signals, indicate that things are not done in a half-way fashion at Wolfpit.

Near the top of the 1,700-ft. incline and between the upper and lower beds of coal worked is the 100-hp. contactor-control hoist which serves the triple duty of handling men, material, and house coal. This machine, which is of the balanced type, is equipped with an automatic gravity-set brake, and a Lilly controller of the type commonly used on shaft and slope hoists.

This feature is unusual on an incline hoist. The controller causes the brake to be set in case of overspeed. It also slows the hoist down and stops it at the limit of travel in case of failure on the part of the operative to properly manipulate the control. The many accidents that have occurred on inclines that lack such

Views Taken at Various Points Around Wolfpit Plant and Mine



(1) Automatic larry at the loading station. The operative is looking out the window of the control house. (2) Larry on the trestle approaching the dump. Remotely-controlled equipment of this type is unusual at coal mines. One thing is certain—the operative would not be injured if the larry should leave the track. (3) About to dump its

load. The small wheel at the rear rides up on a beveled block in the center of the track and opens the latch holding the side doors. After discharge, the doors close and lock by gravity. (4) Substation which is controlled by automatic telephone. It contains two 200-kw. full-automatic synchronous motor-generator sets. Its location is an iso-

lated spot a mile through the hill from the main portal of the mine. (5) Starting the substation from the motor barn. Dialing the proper code number from any phone starts or stops the key machine, and its performance can be heard in the receiver. (6) Interior of the substation. The control equipment is standard except for a small magnetic switch.

protective features is ample proof of their necessity.

It has been mentioned that the hoist handles house coal. The reason for this is that the regular mine output is chuted down the mountain side in a 30-in. pipe. This method of handling naturally breaks the coal into sizes too small for domestic use. The mine is in the Elkhorn bed and furnishes byproduct coal to the steel mills.

At the level of the lower seam an unusual method is employed in transporting coal around the hillside from the lower end of the upper-seam chute to the intake of the main pipe which conducts the output from both beds down to the railway level.

This movement of the coal is performed by a remotely-controlled and automatically-dumping larry of 10 tons capacity, which operates at a speed of 700 ft. per min. In so far as coal-mine practice is concerned it is an unusual sight to watch the loaded larry travel seemingly unattended along the track, dump its load at the feeder bin and return to the loading chute.

The man who handles this larry is stationed in a control house above the loading chute. He raises and lowers the gates and operates the drum controller which is connected in series with the circuits feeding the trolley wires of the larry track. One trolley and the rails are used for travel in one direction; the other wire and rails for movement in the reverse direction. A round trip of the larry over the 690-ft. track requires about 125 sec.; this rate of operation gives it

an hourly capacity during normal operation of 280 tons.

Full-automatic substations operating on purchased power furnish 250-volt energy to the mines. The two substations, containing synchronous motor-generator units are about a mile apart. One, of 200-kw. capacity, is located close to the outside motor barn of the lower bed, and the other containing two 200-kw. units is at a drift opening on the opposite side of the mountain.

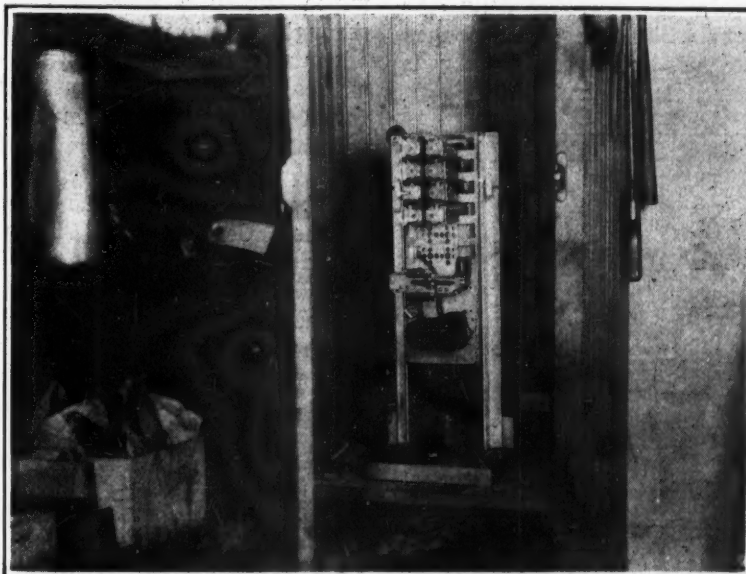
This installation has two unusual features. One is the employment of full-automatic equipment in a substation located within a few feet of where men are on duty most of the time. The other is that the distant substation is arranged so that it can be started and stopped from any one of the automatic telephones of the outside plant. I. N. Tull, chief electrical engi-

neer of the McKinney Steel Co. introduced these details.

The use of full-automatic equipment even when located close to attendance is commendable. The automatic control and protective apparatus is on duty throughout the full 86,400 sec. of the day and night. Consequently the service and protection afforded is not to be compared with that given by a full-time attendant in a manually operated substation.

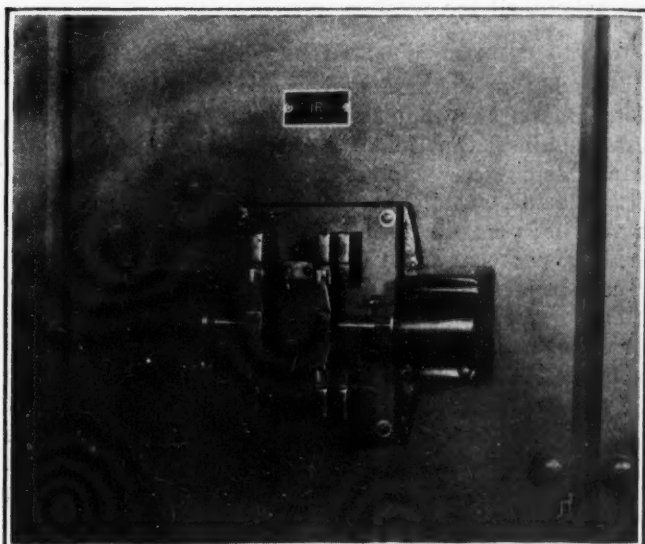
Starting and stopping of a full-automatic substation by telephone is a feature that costs but little extra to install when connection to an automatic telephone system is possible. The only extra apparatus required is an ordinary transmitter mounted under the machine, a selector switch, a relay-operated, double-throw control switch, and a 48-volt primary or actuating battery.

As arranged at Wolfpit, only one of the two machines can be started and stopped by telephone. Operation of the other unit is governed entirely by load conditions, but it cannot start unless the telephone-controlled machine is running. A manually-operated



Substation Selector Switch

This is mounted in a small cabinet in a rear corner of the building. When the proper number is dialed from any phone this selector makes a contact which energizes the coils of a magnetic control switch on the main board. This switch in turn opens and closes the substation control circuit.



Control Switch on Main Board

This is the only evidence on the substation panels that there is provision for starting by telephone. The electro-magnets, energized by the telephone selector, pull the sliding switch to one side for starting and to the other side for stopping.

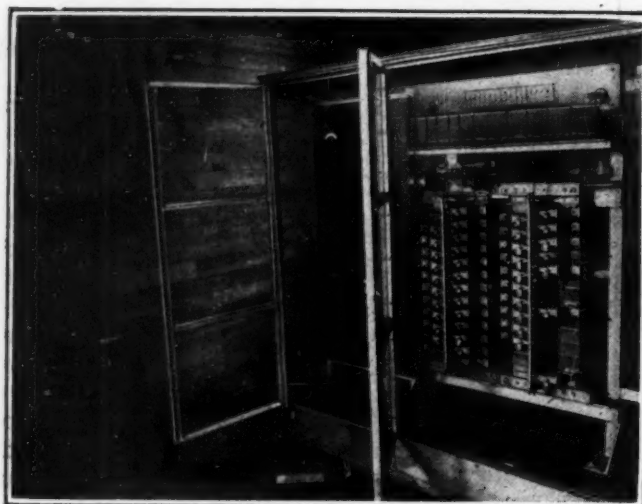


Transmitter Under Motor-Generator

A transmitter is placed in the pit under each machine. It transmits the noise made by the machine in starting or stopping and therefore assures the person who is controlling the substation by telephone that the equipment has responded.

switch in the substation determines which machine is to be the one controlled by telephone.

By dialing the proper code number from any phone, connection is made to the transmitter under the motor generator and to the control relay. The noise of starting or stopping the machine is reproduced in the receiver of the phone from which the substation is being started. A failure to act, or any irregularity is apparent to the one effecting the control.



Switchboard of the Automatic Exchange

This board is located in a small building near the office. The capacity is 80 phones and there are 69 in use. Instantaneous service at all hours is the ideal for any telephone system. The automatic gives practically that service without the expense of an operator.

Use of an automatic telephone system in lieu of a mine exchange in itself is by no means common, but has many advantages. Apparently its only disadvantages are its higher first cost and a slightly greater complication of equipment. The item of higher cost is wiped out in a year or two by the saving effected through the elimination of an operator. The other disadvantage mentioned has proved to be of little consequence. Mines using automatic telephones have not found it necessary to hire special maintenance men for that equipment. The chief advantages secured by such systems are the instant and continuous 24-hr. service afforded and the elimination of the operator expense. Conversation privacy is another item which at times is highly important.

Still another modern practice at the McKinney Steel Co. mines is the liberal use of sectionalizing breakers of the automatic-reclosing type. Thus one of these devices is placed at the entrance to each drift and one in each principal branch circuit. This protection and control reduces the fire hazard and greatly increases the general service efficiency of the direct-current trolley and feeder system.

Taken as a whole the equipment installed at the Wolfpit operation is unusual for a mine of not over 1,500 tons capacity. It shows the influence of steel mill practice. Every reasonable means is taken to make the equipment safe. Devices such as the automatic phone, are installed to increase the efficiency of the foreman. Wherever practicable, also, labor has been replaced by machinery. In many ways the mine is a full stride ahead of the average operation of its size.

Gas Masks Demonstrate Their Utility

Probably the most interesting of the papers presented before the recent first-aid and mine-rescue meet in California, and one that applied especially to the coal mining field, was that of J. T. Ryan on the all-service gas mask and the self-rescuer. Both of these devices have been made possible by the development of a catalyst, Hopcalite, which has the property of oxidizing carbon monoxide to carbon dioxide. Mr. Ryan said in part:

"The Bureau of Mines, in its investigation of gas masks for use in mining and allied industries, has established a permissible schedule, 14 A, under which masks that meet their requirements after being submitted to exhaustive tests are granted a certificate of approval. The all-service gas mask has been approved by the Bureau of Mines under this schedule for respiratory protection in mine atmospheres where safety lamps are burning, and for use above ground in air that contains acid gases, organic vapors, or carbon monoxide not exceeding two per cent by volume, ammonia not exceeding three per cent, and in smokes, dusts and mists or in atmospheres containing not to exceed two per cent of poisonous gases when more than one gas is present.

"The final test of the Bureau for approval was to subject the mask to an actual working test by three men wearing it in an unventilated, gas-tight chamber of 1,000 cu.ft. capacity, to which had been added the following gases in the percentages as stated, and determined by analysis: Sulphur dioxide, one per cent; carbon tetrachloride, one per cent; ammonia gas, two per cent, and in a second test one-half per cent; and

cotton smoke, the density of which was such that the hand was invisible at arm's length.

"The three men wore the masks for a 30-min. period in each of these concentrations, performing, successively, hard work, walking, and running. The Bureau's published report of the approval states that: 'The masks gave good protection throughout all of these tests; they were comfortable and there was little interference with movements; vision was good and of fairly wide angle; and resistance to breathing was tolerable throughout all the work required.'

CANISTERS WERE GIVEN SEVERE TESTS

"In addition to the actual wearing tests of the complete masks, the cannister was subjected to separate tests against the following gases—chlorine, hydrocyanic acid gas, sulphur dioxide, phosgene, carbon tetrachloride, gasoline, ammonia and carbon monoxide, in varying percentages required by the schedule, from one-half per cent of sulphur dioxide to four per cent of carbon tetrachloride and ammonia, and one per cent of carbon monoxide under the worst possible conditions for the operation of Hopcalite, namely, at a temperature of 0 deg. C. and 100 per cent relative humidity. The air flow in these tests was 32 liters per minute, about the rate of breathing for the average man when working. Some tests were made at 64 liters per minute.

"This test against one per cent of CO was for a period of 460 min., or 7 hr. 40 min., without CO coming through the cannister. We have, in our laboratory, run cannister tests under more normal conditions of temperature and humidity for days without CO coming through when the air flow of 32 liters per minute contained one per cent of carbon monoxide."

Changing Mining Methods to Increase Production*

Phelps Dodge Makes Trials—Portable and Shaker Conveyors Used—Scrapers Also Tried—Believed that Face Can Be Pushed Too Fast for Best Results

By Scott Dupont

General Underground Superintendent, Stag Cañon Branch,
Phelps Dodge Corporation, Dawson, N. M.

BECAUSE OF A SCARCITY of miners, and the necessity of decreasing mining costs, the Phelps Dodge Corporation, Stag Cañon Branch, at Dawson, N. M., decided to try, by various methods of mining, to increase the tonnage of coal mined per man per day. With this end in view, the management first tried mining on a 250-ft. face, along which the track was maintained, and using six to eight men shoveling. These men were able to average from 10 to 12 tons each per day when loading, but so much time was taken up in brushing, maintaining track and the like that what was gained in tonnage per man was lost in dead work. However, the possibility of controlling the roof was demonstrated in this panel, the recovery of timber was good, and at no time was the face lost.

After loading out this block of coal to within 100 ft. of the entry, 20-ft. portable belt conveyors were installed in tandem to retreat on a 60-ft. barrier pillar, a 50-ft. chain pillar and 100-ft. room stumps, providing a combined face of 210 ft. The gob line in these workings was about 400 ft. long. The top was hard sand rock and the bottom soft shale. At first two lines of cribs were used to protect the face and six men were employed as loaders. Later the cribs were discontinued and four rows of props employed instead, with better results. Much trouble was encountered in removing cribs, while pulling props presented no difficulty.

TONNAGE WAS INCREASED AND COST REDUCED

With this arrangement a fair showing was made in tons per man, and the expense of brushing and laying track was greatly reduced. In retreating a distance of 250 ft. (up to the present time), the face was lost three times, because of insufficient timbering. In this particular instance the coal was mined on the butts.

Similar conveyors were next tried in four V-panel, 280-ft. rooms with a face of 240 ft. The length of the angle faces was from 50 to 55 ft. The coal was loaded in cars in each of the four rooms by means of the portable conveyors. The height of the coal averaged 4 ft. 8 in. With this system the time of retreating 205 ft. was three months, working an average of four days per week, with a crew of six shovelers. Through careful attention to the timbering it was possible to keep the points of the pillars open at all times. This was an important factor influencing the output obtained, which amounted to an average of 107½ tons per day for the six men employed. The prop recovery was about 95 per cent. No trouble was experienced in ventilation on the retreat as no gas was encountered.

The V-panel system was also tried in No. 6 mine where the bottom is hard and the top an unusually soft shale. After retreating 75 ft. the system was abandoned because of an inability to properly timber the

roof and also on account of the gas here encountered.

As a further experiment conducted for the purpose of studying roof control where both the top and bottom were soft shale, a 450-ft. face was opened up in a panel by driving three roadways 290 ft. in length.

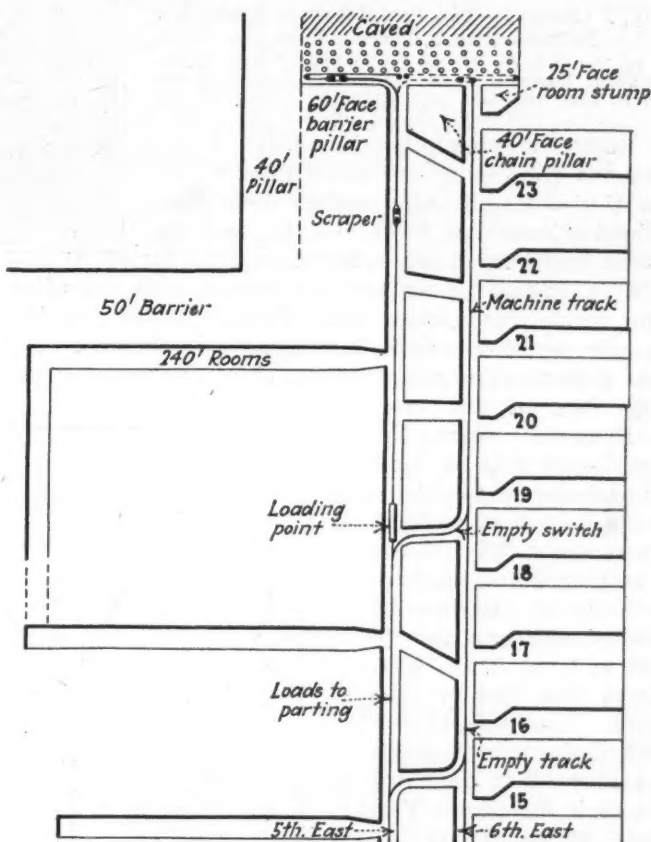


Fig. 1—Scraper Working on Retreat

Work was started first at the point indicated at the top of the illustration. The broken line shows the position of the fall and head ropes when removing the coal on the right, the solid line indicates their position when removing that on the left. A trip of cars was placed in the back entry. These were uncoupled and run one by one to the loading point where they were recoupled as rapidly as they were filled. The coal is now removed as far as the first 240 ft. room. The pillar between it and the second room will be removed as a single 240-ft. face. Later 300-ft. pillars will be worked in the same manner.

It was found that by propping the first 30 or 40 ft. firmly until the entire face had been developed and the break line established, the roof fracture could then be controlled by pulling all supports beyond the break line. The entire retreat of 215 ft. was accomplished by carrying four rows of props and at no time did the roof ride over the face.

Shaking conveyors were installed in the roadway at the center of this 450-ft. face and the portable conveyors used on each side delivering to the shaker.

Experiments are also being made with a scraper loader, retreating at present on a 110-ft. face with the expectation of later increasing this distance to 240 ft. The results to date have been satisfactory.

*From a paper entitled "Increasing the Production per Man by Changing Mining Methods, at Dawson, N. M.," presented before the recent meeting of the Rocky Mountain Coal Mining Institute held at Glenwood Springs, Colo., Sept. 9 to 11, 1926.



Fig. 2 (Above)—Two Portable Face Conveyors Delivering to a Shaking Conveyor

In No. 8 mine, Phelps Dodge Corp., Stag Cañon Branch, Dawson, N. M. The face conveyors are 20 ft. long and each is operated by a $\frac{3}{4}$ -hp. motor.

Results of attempting to remove a continuous face in a bed more than $6\frac{1}{2}$ ft. in thickness, has been rather disastrous. The company has been able to open up faces and retreat for a distance of 75 to 100 ft. in this particular character of coal, but after the supporting timbers have been removed for the second or third time it has been found that the roof has a tendency to ride over the props and break off at the face of the coal.

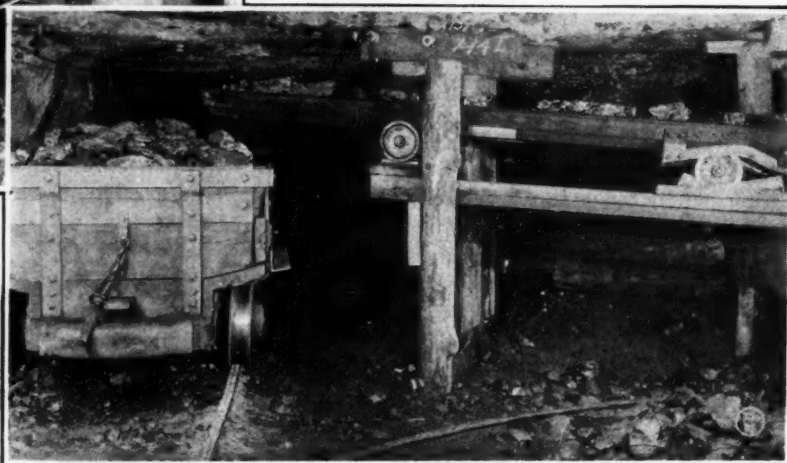
However, where the coal is less than $6\frac{1}{2}$ ft. in thickness excellent results have been realized in handling the roof and breaking it off systematically at the line of props, which are usually set at from 12 to 15 ft. from the face of the coal. The practice followed is to set props at about 2-ft. intervals in each direction. Two sets of props are removed while two additional sets are being placed along the coal face. At all times it is highly essential that all props be removed from the gob and that all of the coal be taken out so it is possible for the roof to break freely and all come down, without interference from any supporting pillars in the gob.

The conclusion derivable from experiments so far conducted is that if all the supports beyond the prop line are taken out as the long face retreats the closer

the breaker line of props is kept to the face the better the results will be. To date, it has never been considered safe to have less than four rows of props to protect the machinery and men working the face.

Fig. 3 (Below)—Loading End of Shaking Conveyor on Entry

Also in No. 8 mine. A car is loaded in from $2\frac{1}{2}$ to 3 min. Note the side angle irons for holding the car in a rotary dump.



It is felt that the time element, that is, the rapidity with which the faces are advanced or retreated, is of vast importance. To date, however, not enough experience has been had to reach any definite conclusion as to

what rapidity of face movement is best suited to local conditions. It is felt that the crushing strength of the overlying strata will govern this to a large extent, and inasmuch as this varies considerably, it will be difficult to reach any definite conclusion. My own opinion is that conditions may be such that rather than have a short face and retreat rapidly, it will be found that a longer face with a slower retreat will afford better results. Such a condition might give the overlying strata time to settle.

The caving of roof or the control of this caving is closely associated with the ventilation. It has been found that in places where the strata overlying the coal consist of shale, the effect of the air on roof control is marked. It is the endeavor, at all times, not only to remove obnoxious gases, but to keep a current of fresh air moving along

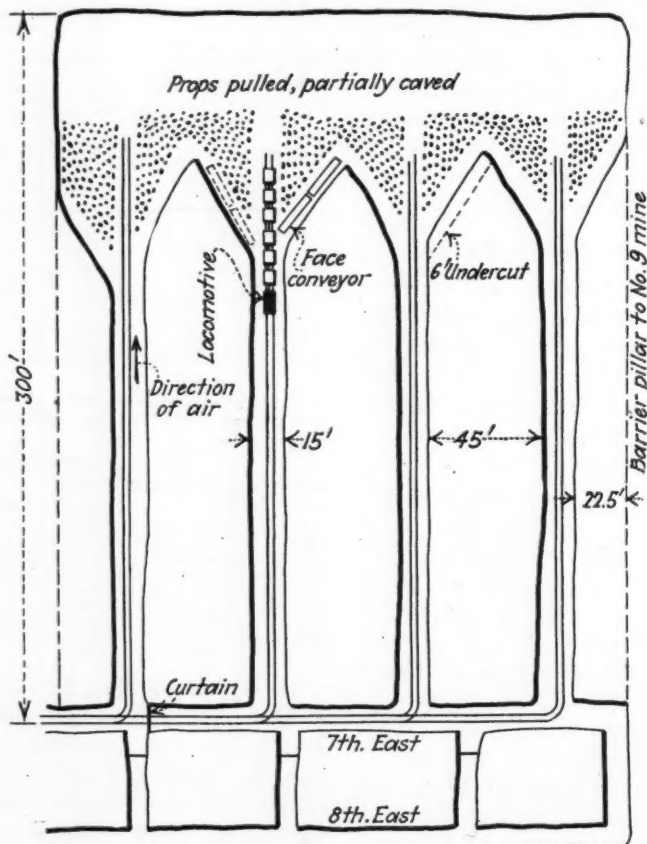


Fig. 4—V-System at Phelps Dodge Mines

This, like all the rest of the drawings and photographic illustrations accompanying this article, is in No. 8 mine. Here, two 20-ft. portable face conveyors in tandem were used on each face delivering directly into mine cars. The pillars have now been removed almost to the entry and the room stumps and chain pillar are being extracted. The six men employed in these pillars averaged $107\frac{1}{2}$ tons per day. About 85 per cent of the props were recovered and the points of the pillars were never lost.

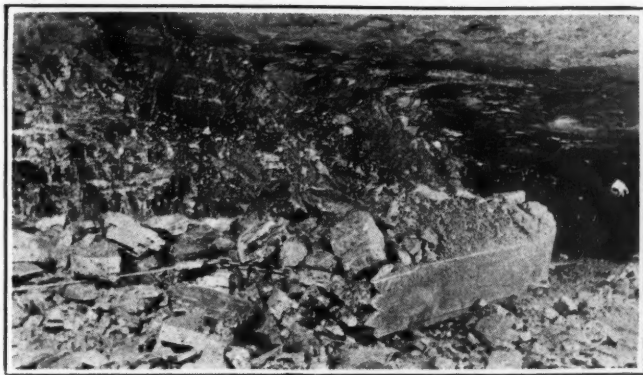


Fig. 5—Scraper Dragging Coal from Long Face

This scoop has a capacity of 1,500 to 1,880 lb. and the face is 240 ft. long. Coal is being worked across the butts. The roof is good at this point, being a hard sand rock. The bed shown has an average thickness of 5 ft. This illustration is from a photograph made in the No. 8 mine of the Phelps Dodge Corp., Stag Cañon Branch, Dawson, N. M.

the face. Naturally, a portion of this air travels over the gob and comes in contact with the roof and overlying strata. This, it has been found, helps materially in keeping the roof on the move. As the practice followed in these mines is to keep water for sprinkling purposes at all places, this water is also used to keep the roof wet back in the gob. The effect of water on the shale is to cause it to disintegrate quite rapidly.

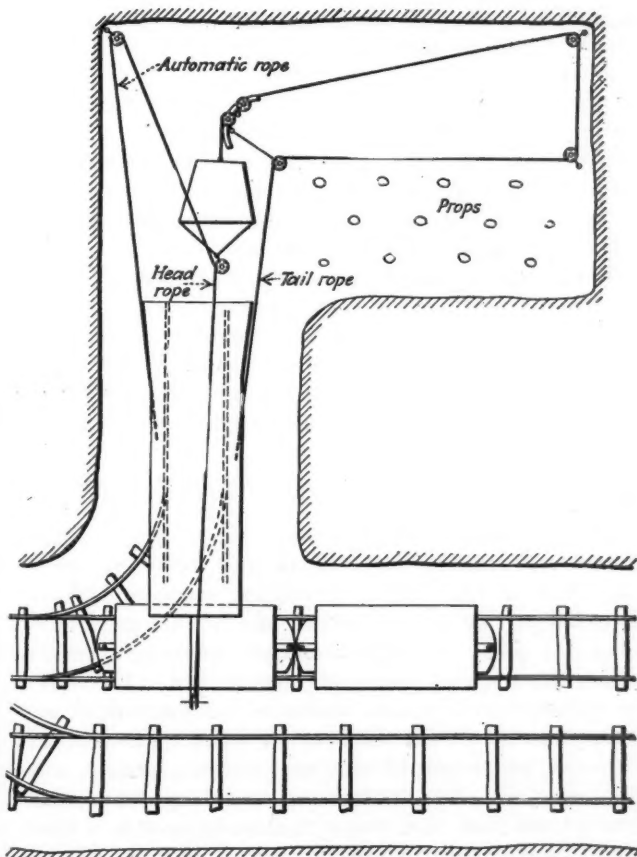


Fig. 6—Plan Proposed for Advancing Rooms in No. 8 Mine

This shows the status when the room is cleaned up. As soon as this is done the inside jack pipes are to be taken down, the cut is to be made and the face shot. The coal at the ends of the room face is to be shoveled out so as to make recesses 3 ft. deep, in which the jack pipes are to be set. When the scraper gets to the position shown the automatic rope will come into action and free it from the hay pulleys. The tail rope will drag it back to the desired position in front of the face, and the head rope acting conjointly with the automatic rope will compel the scraper to traverse the face picking up coal as it goes. When the coal is gathered to a depth of 3 ft., the jack pipes will again be recessed and the rest of the loose coal removed. Bad roof may prevent the success of this plan.

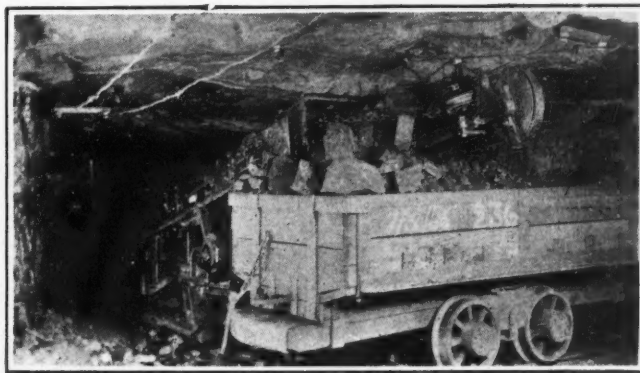


Fig. 7—Loading End of Scraper Conveyor

This is a companion illustration to Fig. 1. The scraper drags the coal up an incline into the car, the capacity of which is 3,300 lb. The car stands 40 in. off the rail. The scraper is driven by a 35-hp. motor and its movement is entirely controlled from this point. Cars that will measure 9 ft. in length on the inside are being installed in place of those shown which measure 8 ft.

Systematic Planning Urged to Overcome Bumps in Westphalian Mines

Bumps in American coal mines occur most frequently in British Columbia; it is reported also that indications of bumps have made their appearance in Wyoming, and in the mountainous regions of Kentucky.

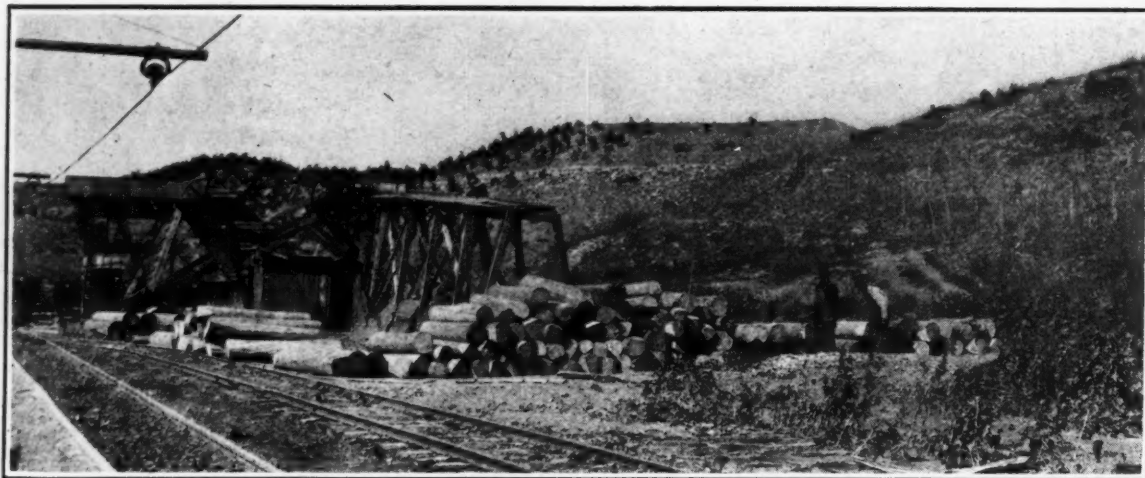
George S. Rice, of the U. S. Bureau of Mines, in 1922 studied gas outbursts in the Cassidy mines (Vancouver Island) of the Granby Consolidated Mining & Smelting Co.

Serious bumps have occurred in the Ruhr district of Germany, particularly when pillar working without stowage was the general practice, and during the years 1896-1899 heavy bumps were experienced in various pits in the Herne district, says the *Colliery Guardian*. Although these occurrences have become less violent since the introduction of stowage in coal mining, particularly hydraulic stowage, they are, nevertheless, more frequent than is generally supposed.

GAS EXPLOSION FOLLOWS

W. Lindemann (*Glückauf*) describes a number of bumps that took place between 1917 and 1925, several of which were attended by serious consequences; in one case seven men were killed and one man seriously injured. He also records cases wherein a gas explosion followed upon the rock burst. Similar occurrences in other parts of the world are mentioned briefly, and the author discusses the causes of this phenomenon. He appears to doubt whether the tectonics of the region play any serious part, but considers the cause to be bending of firm strata overlying a pillar of coal left standing.

When the tension thus set up is suddenly released by any means a heavy pressure is induced upon the edges of the pillar. He suggests that in order to prevent these accidents, measures must be adopted to prevent such bending of the strata overlying the coal, which may be effected by close stowage of all hollow spaces. He considers hydraulic stowage to be especially efficacious. The workings must be laid out in such a manner as to avoid leaving isolated or projecting pillars of coal. The author also suggests that it might be advantageous to insert shots into the roof of coal seams where such a state of tension exists, and to blast these at times when nobody is in the pit, in order to release the tension.



Timber Preservation Yields Encouraging Result*

Timbers Treated by Dipping After Framing—
Untreated Sets Last Two Years—Treated Ones
Still Good After Over Four Years of Service

By F. T. Baker

Superintendent, Colorado Fuel & Iron Co., Primero, Colo.

THE PRIMERO Mine, operated by the Colorado Fuel & Iron Co., is located 17 miles west of Trinidad, in Las Animas County, Colorado. At this operation unusually bad roof together with heavy side pressure and other conditions conducive to rapid decay of timbers all combine to create an extremely serious timber problem. The coal averages about 6½ ft. in thickness; it is of heavy coking quality and has a tendency to crush easily and thus break down within the bed. About 35 ft. of loose shaley rock lies immediately over the coal, or between it and a massive sandstone formation above. As the coal is extracted the air causes this shale to disintegrate and swell to such an extent that within 24 hours roof falls varying from 5 to 15 ft. in height are liable to occur.

Under such conditions as have been outlined it is necessary to employ heavy three-piece sets in both rooms and entries. These must not be spaced farther apart than 3½ ft. center to center and must be maintained within a distance of 3 ft. from the face. Rooms in this mine are pitched on 60 ft. centers and cannot be safely driven more than 14 ft. in width and 200 ft. in length. The large pillars resulting must be maintained in order to withstand the side pressure. The rooms also must be driven up and drawn back as quickly as possible to avoid the squeeze caused by the excessive roof and side pressure. Best results in extraction have been obtained by driving rooms to a depth of only 150 ft.

Under circumstances such as these it will be readily

*From a paper entitled "Preservative Treatment of Mine Timbers at Primero Mine," presented before the meeting of the Rocky Mountain Coal Mining Institute held at Glenwood Springs, Colo., Sept. 9 to 11, 1926.

The headpiece shows timber that has been cut to size or dimensioned and which is now ready for treatment. It is necessary that such timber be cut to shape before treatment so that all surfaces may be acted upon by the preservative. Cutting or sawing after treatment allows the air to gain access to wood not affected by the preservative and internal decay starts.

seen that timbers of small diameter cannot be utilized for roof support in development or other work intended to be of a permanent nature. Entries are driven 9 ft. wide and special peeled piling having an average diameter of 12 in. is commonly used. It is necessary to employ lagging between the cross-bars.

The peculiar conditions here encountered necessitated a heavy expenditure for mine timber. In addition to ordinary 7- and 8-ft. props a yearly average of 65,000 ft. of heavy peeled piling ranging in diameter from 10 to 12 in. is necessary. Annual expenditures for timber of all grades exceed \$60,000 and timber costs per ton average approximately 29 cents.

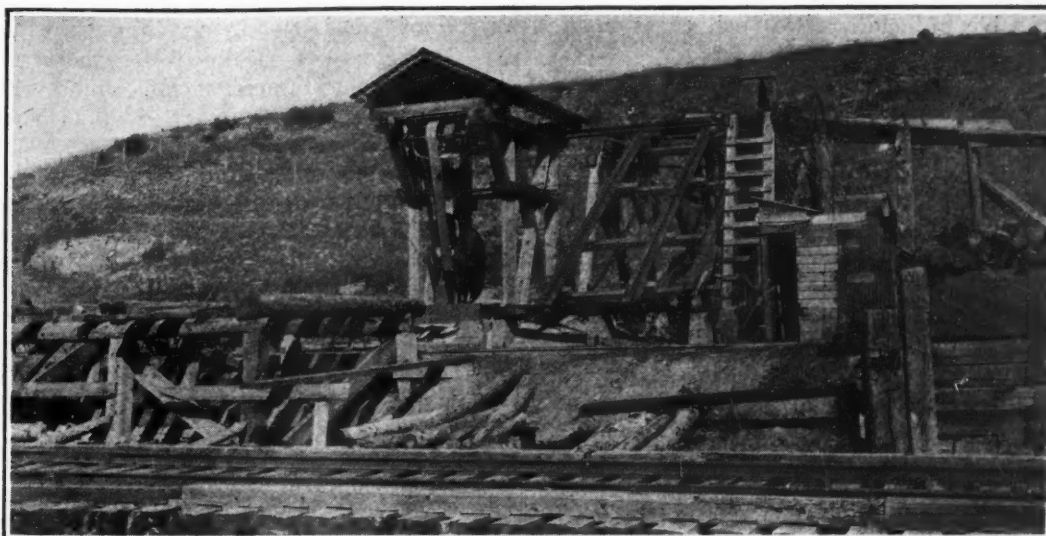
CAREFUL SURVEY WAS MADE

In view of the exceptionally severe duty imposed upon timbers at Primero, the company, in 1920, undertook a survey with the idea of providing some remedy for this problem. A comparison of the life of main-entry timbers at other bituminous mines was made and an average life of four years was established. The actual data collected at Primero indicated an average of less than two years in the manway or return airways and up to five years in the haulageways or intakes. Although some of this timber will stand up for a much longer period than that named a close inspection will reveal, in most cases, that its usefulness is spent.

It is highly essential when discussing the life of timber, especially that used on main haulageways and air courses that a distinction be made between its duration of service, that is, the period during which it is found to be serviceable and able to carry weight and the point of breakdown or failure, or the time when it is no longer sound and able to carry weight. In figuring the life of mine timber the serviceable period only should be considered as timber will sometimes remain stand-

Framing Equipment

It is essential that all timbers shall be framed before preservative treatment is applied. This shows the swinging saw by means of which the timbers are cut to shape and the elevator that takes them away. This equipment can be used on all mine timbers regardless of whether or not they are to be creosoted.



ing long after it has become entirely decayed and useless for roof support.

Most of the timber ordinarily used in permanent work at Primero is Alpine fir, or what is locally termed red spruce. The supply of this timber is gradually becoming depleted and even now it must be obtained from a point so distant from the mine that the price paid is becoming an important factor in the gradually rising expenditure for timber. The average cost of peeled fir in diameters ranging from 7 to 12 in., is about 15 cents per lineal foot, which with a normal life of four years, and an interest charge of 5 per cent, amounts to 4.3 cents per lineal foot per year of service. This figure covers the timber only and takes no account of the cost of installation.

Timber sets installed in return air courses are quickly affected with fungus growths and do not last more than two or three years before reaching a stage where they are no longer able to withstand the roof and side pressure, thus rendering replacements necessary. A plentiful supply of white pine is available within easy reach of the mine and as a result of the timber survey made by the company, it was decided to erect a treating plant so as to utilize some of this class of timber. Several methods of treatment and various preservatives were investigated but coal-tar creosote applied by dipping in an open tank was finally decided upon to meet the local requirements and conditions. This plant was completed and placed in operation in 1922. A brief description of it and the methods employed in its operation follows:

The open-tank dipping process is extremely simple. The equipment consists of two open treating tanks, 22 ft. long and 4 ft. 3 in. deep; one 20,000-gallon storage tank, 10 ft. 6 in. x 30 ft.; two storage tanks 16 ft. long by 66 in. in diameter, these are old boilers and are intended as hot and cold storages, their capacity is 2,800 gallons each; one 12- x 7- x 12-in. Burnham pump and one 3-ton Simplex chain block suspended from a

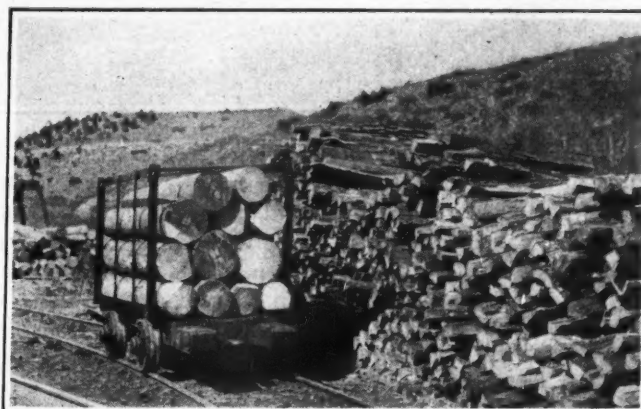
traveling crane. The 20,000-gallon storage tank is connected with the hot and cold storage tanks by a 3-in. gravity pipe line and these tanks, in turn, are connected with the treating tanks by 4-in. gravity lines, the liquid being forced back by the pump.

When the treating tanks were first installed they were lined with No. 26 gage galvanized steel, all joints being soldered. This was found to be too light to withstand the rough handling necessitated by the heavy timber treated. Furthermore, the creosote ate out the packing around the valves and pipe fittings. It was later necessary to replace these linings with No. 16 gage steel. All joints in these later linings as well as those in the pipe fittings were electrically welded. This gave satisfactory results.

All of the timber used was cut within a radius of twenty-five miles of the plant, the native white pine and red spruce being the varieties treated. The bark is first removed and, to obtain the best results in treatment, the timber should be thoroughly seasoned and framed to meet requirements before being placed in the dipping tanks. It has been found that timber not thoroughly seasoned will refuse to absorb

sufficient of the preservative to prevent the growth of fungi after installation in the mine in a section where the supply of air is limited, such as on return manways. Red spruce requires a longer period of immersion in the preservative liquid than does white pine.

Upon arrival at the plant the following method of treatment is carried out: The timber is unloaded onto a platform at the sawmill where it is cut to the proper length and framed according to specifications. It is then loaded into cages especially constructed of angle irons, and mounted on pit car trucks. These are taken to the treating tank. The cages, together with the timber they contain are hoisted bodily by the chain blocks into one of the tanks. Each cage will hold an average of ten timbers each 14 in. in diam. and varying in length from 7 to 10 ft. Each treating tank is



Loaded Into a Cage Ready for Treatment

In this mine the timbering is necessarily heavy. The sawed and framed logs are loaded into steel baskets or cages set on trucks and do not leave them until after draining. The cage and a set of chain blocks on a trolley make handling easy.

capable of holding two such cages making a total of four at one treatment.

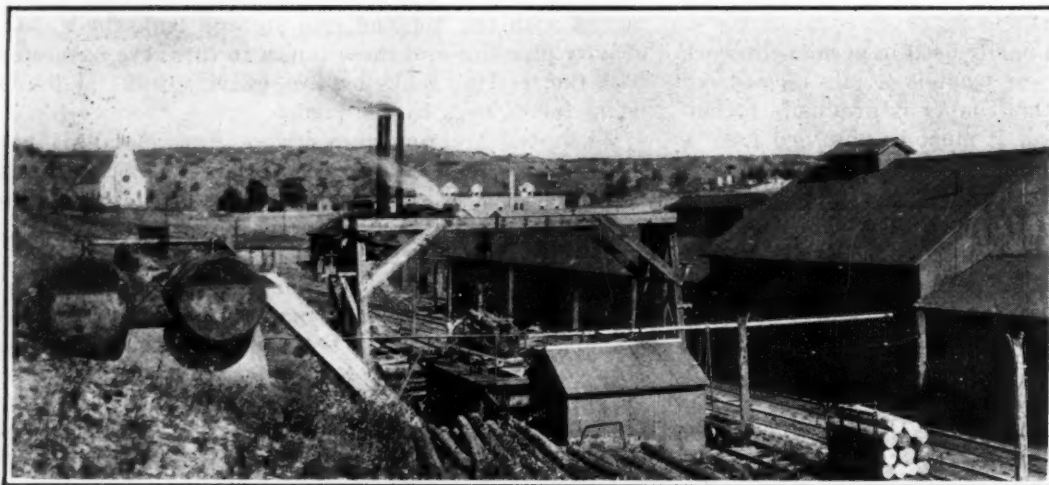
After the cages have been placed in one of the empty tanks the valve in the line from the hot storage tank is opened and allowed to so remain until complete submersion is secured. By means of steam coils in the bottom of the heating tank the temperature is then gradually raised until a maximum of 150 to 200 deg. F. is attained. Timber is kept in the hot bath from one to three hours, according to its seasoning. The second tank is filled with two cages of timber and the valve from the cold storage tank opened to the first heating tank causing the hot liquid to overflow into the second tank. Timbers are only left in the cold bath long enough for the liquid to reach a minimum temperature of from 60 to 100 deg. F.

No injurious effects have ever been observed on the health of the men engaged in timber treatment. In extremely hot weather work around the hot dipping tank

destroyed by crushing rather than by decay. The process of treatment is expensive and when a squeeze is encountered of sufficient severity to break down sound untreated timber, it will also destroy the more expensive treated sets. Experience also has shown that treatment with creosote adds little to the mechanical strength of wood. Although its life may be materially increased by the use of preservatives, this is usually of little value unless the treatment reduces maintenance charges. This latter can only be taken advantage of through installation in sections of the mine that are of a permanent nature, or where it is conservatively calculated that squeezes and other factors tending toward mechanical failure may be avoided.

COMPARISONS WERE MADE

Treatment of timber began at Primero in December of 1922 and the first treated sets were placed in the Main North mine in February of 1923. As here used



Treating Plant

This plant consists essentially of two storage tanks, two treating tanks, a pump and the necessary heating equipment. There is nothing complicated or mysterious about it and it can be successfully handled by any intelligent workmen. Some slight discomfort from the warm preservative is experienced in hot weather, which is relieved by applying vaseline.

has the effect of causing a slight burning sensation on the face and hands when coming in close contact with the oil. This disagreeable effect when working in the sun in weather that is unusually warm can be overcome by using cottonseed oil or vaseline applied as a lotion to the parts affected.

CHECKING OR CRACKING IS INJURIOUS

When timber is removed from either of the treating tanks it is allowed to dry thoroughly before being taken into the mine. It should not, however, be permitted to remain out in the sun until large checks or cracks appear, as the value of the treatment is greatly reduced if any portion beyond or within the absorption zone of the preservative is exposed to the air. Extra care is necessary in loading and transporting into the mine and setting in place. If mechanical abrasions of the surface occur, or if additional framing becomes necessary after treatment, a two-coat application of the preservative is required on the exposed surfaces to afford protection.

After the timber has been treated and thoroughly dried it is taken into the mine and set in entries, the life of which has been calculated to exceed the life of untreated timber. It is perhaps unnecessary to state here that treated timber as a matter of economy should be used only in working places that are to be maintained for a period of years sufficiently in excess of the natural life of the timber to justify its use. Furthermore, the experience at Primero has been that it is poor policy to use treated timber in sections where it is liable to be

a set consisted of two 7-ft. legs and a 9-ft cross-bar, the average diameter being 12 in. Sets of untreated timber were interspersed at varying intervals with treated ones, so that comparison could be made between them. These particular sets were all placed on a return air current. This mine was shut down in February, 1925, and a small booster placed in operation for the ventilation of the whole operation. Consequently, only a limited quantity of air has been permitted in this section.

An inspection of these timbers was made in August, 1926, or more than 3½ years after they were placed. It showed the treated timbers to be perfectly sound and in as good condition as the day they were placed, whereas in practically every instance the untreated sets along this entry were so badly decayed, especially where the legs touched the bottom, that a 4-in. knife blade could be easily thrust its entire length into the wood. This condition was equally true in other sections of the mine where treated sets had been installed.

TREATMENT RENDERS IMMUNE

During the past year it has been necessary to retimber practically all of the main air course and some parts of the main haulageway, but in no case was it necessary to make replacements in sections where treated timbers had been used exclusively. In no instance was the failure of a treated set noted except where the preservative had been imperfectly applied, where the wood had been subjected to mechanical abrasions or had



Creosoted Timbers Ready for Use

After treatment and draining the timber is piled as here shown. It is not advisable, however, to allow it to remain too long in the hot sun as it is liable to check and crack, thus allowing the air to reach the interior and decay to start from within.

decayed through a failure of the workmen to apply a fresh coating in cases where additional framing had been necessary after the timber had been taken into the mine. Many of these sets were used in the Frederick, Berwind and Toller mines during 1923 and 1924. In the Berwind mine especially the conditions under which they were used were severe as the roof pressures were heavy and the timbers were all placed on the return airway serving the entire mine. No failures of treated timber have occurred.

All the timbers have been dated by means of nail tie dates showing the month and year in which they were installed. Too much emphasis cannot be placed on keeping accurate records, as time is the chief factor in determining the value and service of treated sets.

TREATMENT WILL CUT COSTS

Such conditions as those depicted have demonstrated conclusively the value and efficiency of preserved timber. As time passes wood preservation will become an item of considerable importance in reducing the outlay for timber in sections of the mine where maintenance cost over a period of years is a potent factor in the expense of coal production.

For the most part coal-tar creosote oil has been used as a preservative at Primero. Some experiments, however, have been made (the results of which have been highly satisfactory) with a preservative sold under the

trade name of "Aczol." The ingredients of this preservative are ammonia, various metallic salts and phenol. It was used in a 6 per cent solution, that is, six parts of the concentrated material was diluted with 94 parts of water in order to secure the proper strength of the treating fluid. This was placed in a tank which was covered to prevent the premature evaporation of the ammonia and the application to the timbers made at ordinary temperature.

Timber placed in this tank was allowed to soak for several hours. It was well seasoned and consequently a good penetration was secured. Sets treated in this manner were placed in a return airway in July, 1922. Recently this section of the mine was abandoned and several of the sets were recovered and placed in the main aircourse. All timber treated in this manner was found to be in a

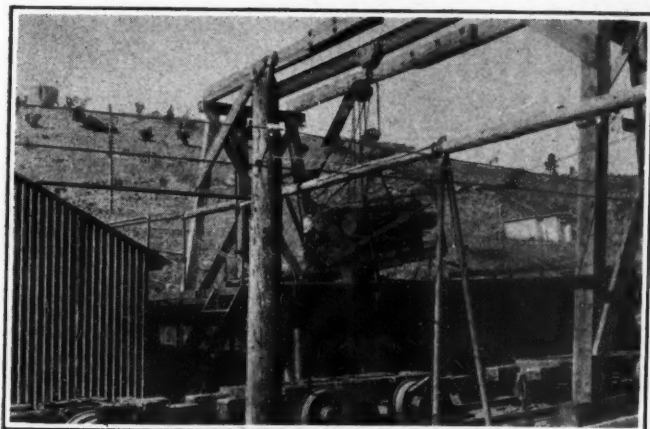
perfectly sound condition, except three or four sets that had been put into place by careless timbermen. The indifferent quality of their work allowed an infection to set in under the treated surface. Untreated sets of the same size placed at the same time had decayed to such an extent that they were unserviceable.

Records of the cost of treatment with creosote show that the expense entailed averages approximately 7.6 cents per lineal foot of piling, in diameters of 10 to 12 in. A natural life of from 10 to 12 years may reasonably be expected from timber treated in this manner. This is more than double the normal life of untreated sets when used on return air courses. If the cost of replacement, which usually amounts to more than the original expense entailed for the timber, is taken into consideration, it is easily seen that an important saving can be effected by treatment.

Four chief agents destroy mine timber. These are decay, insect attack, fire and mechanical abrasion. Decay and insect attack are credited with more than 50 per cent of the destruction of timber used in mines. Numerous methods may be employed to conserve mine timber, such as better selection, preparation, storage and segregation. It frequently happens today that good timber goes into places where wood of an inferior quality would suffice equally well and timber of inferior quality is sent into localities where only the best should be used. However, the most effective means of conservation is by treatment with some standard preservative that will prevent decay.

Some of the benefits to be derived from the use of preserved timbers are: A reduction in operation cost, because of a decrease in timber purchases; a lessening of interference with mining operations because of fewer timber failures on main haulageways. Timber preservation prevents excessive falling of rock in entries because of the wood remaining in sound condition: it also conserves timber supplies and makes possible the utilization of inferior varieties. It reduces the danger of mine accidents and improves mine ventilation while simultaneously lessening the fire hazard.

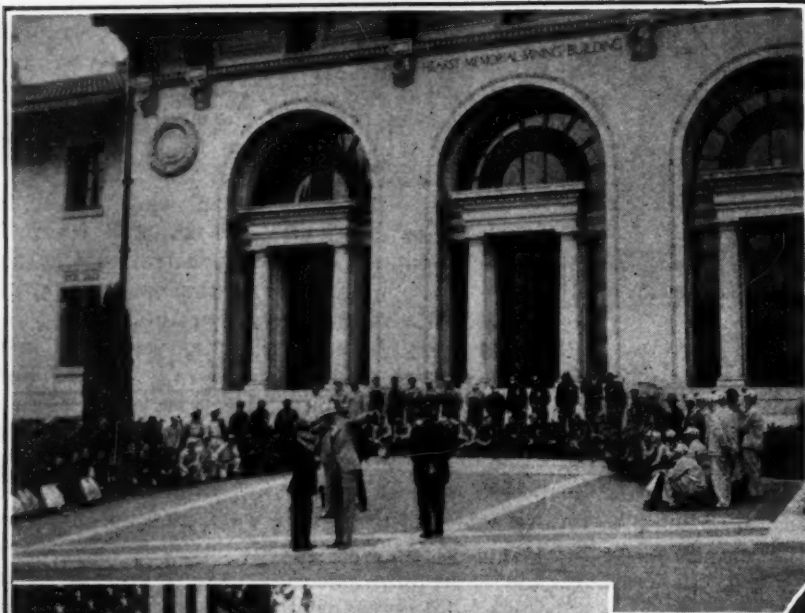
The experience of the Colorado Fuel & Iron Co. with wood preservatives has not yet covered a period of sufficient duration to establish what length of life may be expected from timber that has been treated. The results obtained during the last four years, however, indicate that the intelligent use of preservatives will effect economies in mine timber costs sufficient to fully justify the expenditure entailed.



Removing Timbers from Creosote Vat

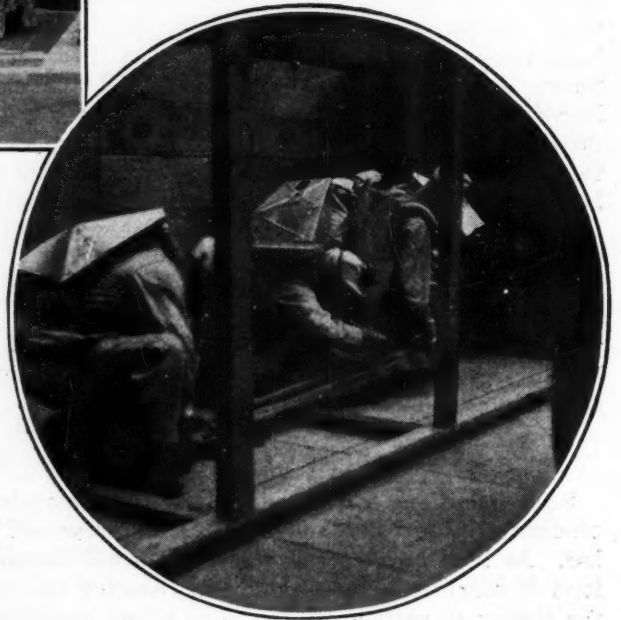
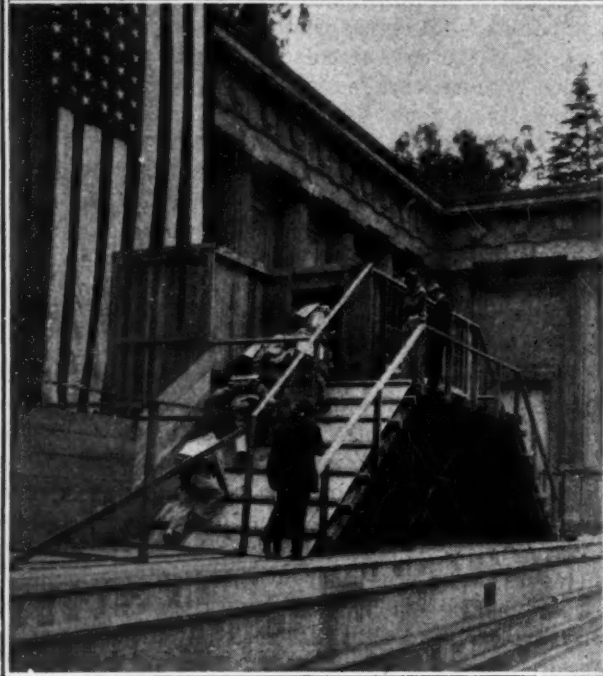
After the timbers have soaked in the preservative for the requisite length of time they are lifted out and allowed to drain after which they are piled ready to be sent into the mine. The cages, chain block and crane greatly facilitate the work of treatment.

Scenes at Recent First-Aid and Mine-Rescue Meet in California



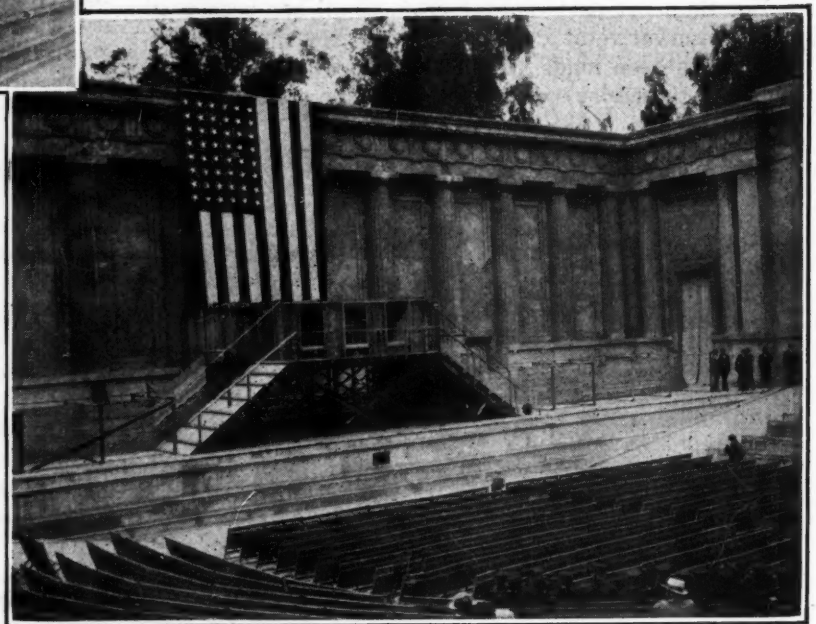
Left—Competing teams in action in front of the Mining Building, University of California, Berkeley.

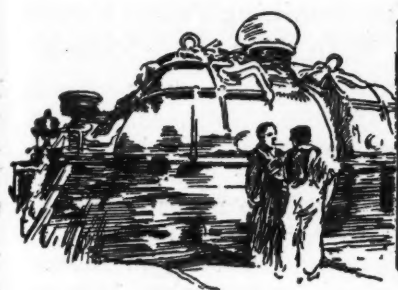
Below—Mine-rescue team, in apparatus, preparing a stretcher for use.



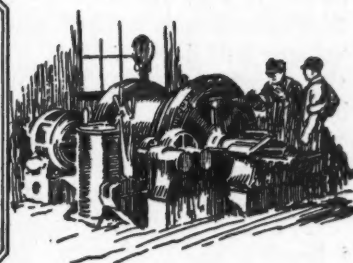
Above—Exhibition "mine" erected in the Greek Theater at the University of California. A mine-rescue team, in apparatus, is moving a "victim" over an obstruction.

Right—Another view of the exhibition "mine" which was constructed especially for the occasion.





Practical Pointers For Electrical And Mechanical Men



Repairing a Cast-Iron Gear by Welding With Oxyacetylene

In many engineering establishments and power plants, one or another of the following repair methods were formerly adopted and are still practiced where modern welding methods are not employed, states E. Andrews in *American Machinist*:

(1) Screwing steel studs in the rim of the wheel, similar to the studs

rapid chilling may be injurious to the casting.

(3) Pinning or screwing on the broken piece as shown in Fig. 2 at A.

(4) Inserting or embedding the new tooth and screwing it into place as shown at A in Fig. 3. The character of the gear and the work performed by it have to be considered,

and while in some cases the repaired teeth may last for years, in others they will only last a few hours or days. Steady, easy working will enable a repaired gear to last a long time, but if it is subjected to

where brass or bronze teeth have been welded into cast-iron gears, they have proved stronger than the original cast-iron teeth.

Cast iron is one of the easiest metals to weld successfully by the oxy-acetylene torch. To those familiar with this method of welding it is well known that there is a knack in making a strong weld in cast iron, that can be acquired only by the exercise of considerable judgment and practice. In consequence, to those unacquainted with the process, the welding of cast iron appears to be more difficult of accomplishment than the oxy-acetylene welding of wrought iron and mild steel, but such is not the case as experienced welders know.

A method of replacing a broken tooth in a 400-lb. gear is shown in Fig. 1. The tooth having been completely broken away, three $\frac{1}{4}$ -in. equally-spaced holes were drilled in the rim, along a center line at the root of the tooth. These holes were then tapped $\frac{1}{4}$ -in., and three studs of mild steel, $\frac{3}{8}$ in. long, were made to suit the holes. The studs were fitted in position and the new tooth built up by means of the electric arc, using a steel electrode. Afterward the tooth was machined to the correct shape and size.

A good method of preparing to build up a broken gear tooth by welding with the oxyacetylene torch, is

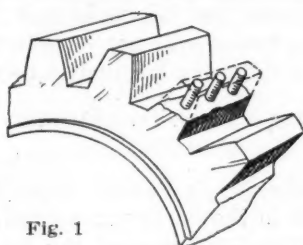


Fig. 1

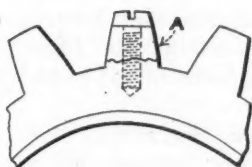


Fig. 2

Fig. 1—Building up Around Studs

Three $\frac{13}{64}$ -in. equally-spaced holes are drilled in the rim along the center line of the tooth then tapped to $\frac{1}{4}$ in. and three studs $\frac{3}{8}$ -in. long used, the new tooth being flowed around the studs.

Fig. 2—Fastening by Screws

The broken tooth is screwed to the rim as at A. Teeth replaced in this manner are only good for light work.

shown in the wheel rim in Fig. 1, and building up the tooth by welding.

(2) Brazing the repair teeth into place. By this method a new piece of blank metal is accurately fitted into a dovetailed groove, filed or machined in the broken portion of the wheel. The new teeth are first roughly sawed to form, and finally filed to the shape of the others. A sheet-steel templet is usually made to the correct form of the gear teeth, then its shape is marked on the blank, care being taken to insure that the teeth are in pitch. When finished, the repair is brazed in place, equal parts of calcined borax and boric acid being used as the brazing flux. The work is heated slowly to a cherry-red over a good, hard-coke fire, then fluxed and the brazing material applied. The heat is continued only long enough to cause the brazing metal to flow into place. After brazing, the work is allowed to cool slowly, as otherwise

shocks caused by sudden changes of speed, or if the wheels working together do not function smoothly, the repaired teeth cannot last indefinitely, although ordinary soldering may be used with some slight advantage in addition to the pinning or screwing methods.

Modern welding methods have shown that the welding in or building up of gear teeth, give a homogeneous structure that may easily be machined and which possess a degree of strength equal to that of the original section. In cases

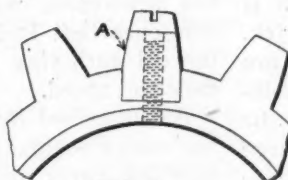


Fig. 3

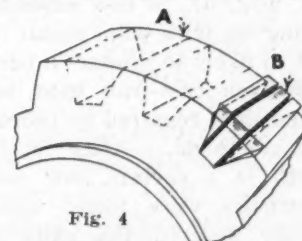


Fig. 4

Fig. 3—Using a New Tooth

The rim of the wheel is slotted and drilled to receive a new tooth which is then screwed to the rim. Teeth repaired in this manner will not stand shocks due to sudden changes of speed very long before failure.

Fig. 4—Building up a New Tooth

The better method is to weld in the broken tooth and adjoining spaces solid with new metal as at A, using a gear cutter to cut out the two spaces. When a gear cutter is not available a new tooth can be built up using carbon plates as at B.

shown in Fig. 5. The carbon wedges hold the carbon blocks in position to form the sides of the new tooth.

These blocks are made from carbons used in arc lamps. They are fitted on each side of the

broken tooth, the space between them giving the shape of the tooth required. To allow for the insertion of carbon wedges, the shaped pieces should overhang the gear-wheel rim at each side. The whole assembly is fastened in place by pieces of wire as shown. In building up the new tooth, the torch flame should play into the cavity between the carbons until the rim metal commences to fuse the welding rod being pushed well down into the molten metal. The space should be filled slightly above the required finished height, so as to allow for filing or machining.

BETTER TO WELD IN NEW METAL

At A and B, Fig. 4, alternate methods are shown for repairing broken gear teeth, with and without carbon blocks or plates. In cases where the gear has cut teeth and a cutter of sufficient capacity is available, the better method is to weld in the broken teeth and adjoining tooth spaces solid with new metal, and then cut out the two spaces with the gear cutter. By this method a solid, well formed tooth is invariably produced. If a gear cutter is not available, considerable hand finishing is required to complete the job. Such work is necessarily costly.

The carbon block or plate method (B, Fig. 4), is less expensive than filling up with solid metal, but it is not so likely to produce a perfect job.

Broken cast-iron gear teeth are oftentimes repaired by thermit welding methods. After cutting the teeth in a certain new gear large blowholes were found which practically severed the ends of three teeth from the gear rim. The defective portions of the three teeth were chipped out and a solid block of metal cast in by the thermit process. The teeth were then cut from the added metal. The gear was put into service, and the welded-in teeth lasted the entire life of the gear.

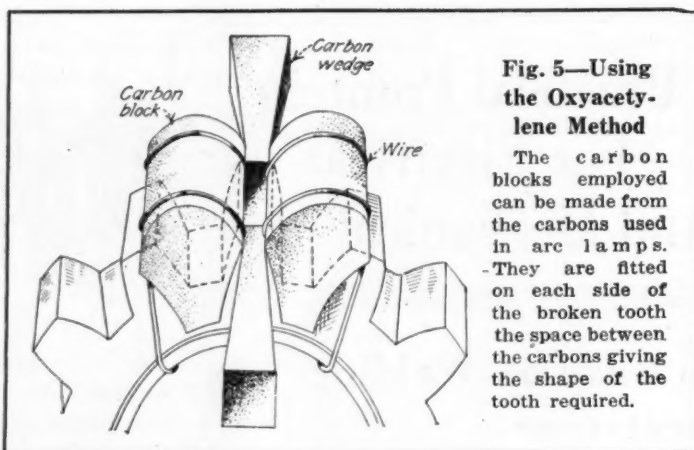


Fig. 5—Using the Oxyacetylene Method

The carbon blocks employed can be made from the carbons used in arc lamps. They are fitted on each side of the broken tooth the space between the carbons giving the shape of the tooth required.

Does Low Voltage Cause Overheating?

Personal experience and contact with the service men of mining machine and locomotive manufacturers have taught the mine electrician that low voltage causes injurious heating of motors. Now a number of electricians are asking the question, "What about operating at 250 volts the 500-volt armatures that several companies have installed in their 250-volt gathering locomotives to reduce the speed?"

This is surely an aggravated case of operating at poor voltage and it is natural for the electrician to expect trouble. But the only case of trouble that has been reported so far was voiced recently by the manager of a commercial repair shop. This man has been rewinding armatures for a certain mine for a number of years so is acquainted to a limited extent with the equipment of that mine.

ARE NEW COMMUTATORS NEEDED?

Not long ago he noted an increase in the number of damaged armatures being sent from the mine, and recognized the offenders as being standard 500-volt armatures. On inquiry he found that 500-volt power had not been installed at the mine, but that the armatures were comparatively new ones that had been installed in the old gathering locomotives to reduce the speed.

As described by this manager of the repair company the trouble with the armatures seemed to originate in the commutator, and he voiced the opinion that a 500-volt commutator will not stand operation at 250 volts. This brings up an interesting question. The experiences and opinions of *Coal Age* readers as to the practicability of operating 500-volt locomotives on 250 volts will be welcomed.

Determining Power Factor With Watt-Hour Meters

At a mine, particularly one served by a public utility company, it is often desirable to be able to determine the power factor of the load even though no meter designed for this specific purpose is available. C. Otto von Dannenberg in *Industrial Engineer* for September, 1926, gives the following method for determining the power factor of a mine being served, by using the watt-hour meter installed. He describes the procedure for both polyphase and single-phase meters.

It is well known that the power in a three-phase circuit can be measured with a polyphase watt-hour meter having two potential and two current coils, or with two single-phase watt-hour meters. It is assumed that in the usual industrial installation the load circuits are ungrounded. However, the necessary modifications can be made and the results obtained will not be affected when the following method is used.

POWER FACTOR DETERMINES VARIATION

Accordingly, it follows that the variation in the energy measured by the separate elements of the meter will depend entirely upon the power factor of the circuit. A good example of this is a load having exactly 50 per cent power factor; if two single-phase watt-hour meters are used, the disk of one will stand still. The general formula for the energy of a three-phase circuit is: Total watt-hours = $W_1 + W_2$, where W_1 and W_2 represent the registrations of the separate elements of a polyphase watt-hour meter or the individual registrations of two separate single-phase watt-hour meters.

MANIPULATION OF TEST

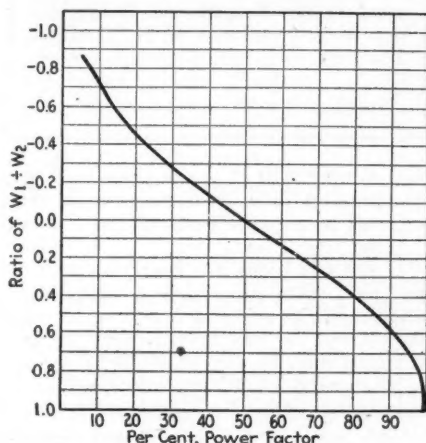
The test for power factor when the meter disks are visible may be conducted as follows: If the watt-hour meter is of the polyphase type, take the time of say ten revolutions of the disk without any change of connections calling this result T_w . Then disconnect one of the voltage elements and again take the time for ten revolutions. The last test will probably take a longer period of time, or T_1 . Knowing the meter constant and if the time is taken in seconds, the total load W_t in watts may be calculated by the formula: Watts = $(3,600 \times K \times R) \div S$, where K = watt-hour constant, R = number of

disk revolutions, and S = time in seconds required for R revolutions.

The registration of the single element W_1 may now be obtained as follows: $W_1 = W_t \times (T_w \div T_1)$. The energy registered by the other element, W_2 , may be found by using the formula $W_2 = W_t - W_1$. The power factor of the circuit may now be obtained as follows: Find the ratio of W_1 and W_2 by dividing the smaller by the larger value and substituting this value for X in the following equation: Power factor in per cent = $100 \times \frac{1}{2} \times \sqrt{(1+X)^2 \div (1+X^2)}$. For quicker determination of the power factor consult the accompanying curve, which only requires that the value of the ratio be calculated.

A WORD OF CAUTION

In connection with the use of the power factor formula, a word of caution should be sounded. When the power factor is less than 50 per cent



Curve Giving Power Factor

By means of this curve the power factor expressed in per cent of unity may be found from the readings of the individual elements of a polyphase watt-hour meter.

one of the meter elements will move faster when operating alone, while the other will reverse. In fact, if the power factor is exactly 50 per cent one of the elements will not revolve when the other is disconnected. If a polyphase meter is used for the test, equation $W_2 = W_t - W_1$ still holds good, except that if one element reverses its rotation, the value must be considered negative or minus. The equation would then become $W_2 = W_t - (-W_1)$ or $W_2 = W_t + W_1$, which shows that the element W_2 would speed up when operating alone. Accordingly the ratio of the smaller value of W divided by the larger would be negative, as is shown on the ordinate of the curve.

Using two single-phase watt-hour

meters it is not necessary to calculate the load in watts as it may be obtained directly from the timing of, say, ten revolutions of each meter. Since the speed is directly proportional to the load the following relation is obtained: $W_1 \div W_2 = T_2 \div T_1$. Likewise, the same number of revolutions of the faster-moving element multiplied by its load equals the time of the slower-moving element multiplied by its load. The fact should also be remembered that in using two separate, single-phase meters, W_1 and W_2 are obtained separately from each meter. These values could be determined from the formula $W_2 = W_t - W_1$, by taking the time of each element separately. It might also be done as a check with a polyphase meter, although this is not actually necessary.

When the meter disks are not visible, the following procedure is required. This is not a frequent condition, but if encountered it will be necessary to take the time required by the meter dial to traverse one division of the smallest dial and calculate the actual load according to the formula: Kilowatt-hours per hour = (kilowatt-hours \div time interval in minutes) $\times 60$ = kilowatts. This must be done as described previously for the visible type meter disk when one element is disconnected. However, in this case, the test may be materially modified; as the time for the same watt-hour or kilowatt-hour registration has been observed, the time will be a measure of the load. The relation $W_1 \div W_2 = T_2 \div T_1$ is applicable; that is, the ratio of the element registrations may be obtained by dividing the lesser time by the greater and obtaining the power factor directly from the curve, or by the power factor formula as previously given.

DEMAND MAY BE DETERMINED

In all of the foregoing tests it has been assumed that particular interest centers in obtaining the power factor value. It is, however, readily possible, if the actual watt demand and power factor are known, to calculate the kilovolt-ampere demand by the formula, kva. = kw. \div P.F.

The description of this method of determining power factor has been given in considerable detail, but its application is exceedingly simple. Advantages that recommend its use are as follows:

(1) No voltmeters or ammeters are required.

(2) No inherent error is involved in calculating the kilovolt-amperes due to instrument errors and the difficulty of taking readings on an unsteady load.

(3) The method is inherently accurate, as the watt-hour meter is an accurate instrument.

(4) When a watt-hour meter is already installed, no additional test instruments of any kind are required.

Discarded Belting Utilized As Trolley Guard

No one method has been generally adopted for guarding trolley wires. It is true that for many years wood was used almost exclusively for the purpose, but it was not suspended or fastened in any one standard manner.



Shows Guard Attached to Hanger

The strips of used rubber belting are held by 3/4-in. studs which have been attached to the hanger by the arc-weld process. The belting is so stiff that supports between hangers are not necessary.

Several years ago the practice of using condemned fire hose as guard material became common. Now old belting is included among the materials used for trolley-wire guards.

The accompanying illustration shows this type of guard in the New Orient mine of the Chicago, Wilmington & Franklin Coal Co., at West Frankfort, Ill. The strips were cut from belting which had served its time in conveying coal at the tippie. Due to the stiffness of the material it is fastened only at the trolley hangers. The 3/4-in. studs to which the guards are attached have been added to the hangers by electric welding.

This belt-type trolley guard is well liked at the New Orient mine. The side pieces hold their shape well, form a guard which does not severely bruise a man's head in case he bumps it, and a guard that is not subject to breakage. The durability and freedom from decay of old belting when installed underground is another good quality so that all in all an excellent guard may be made from this material.



News Of the Industry



Sees Interests of Miners' Union, Operators and Public Promoted By Early Agreement on Wage Pact

By Paul Wooton

Washington Correspondent of Coal Age

A wage conference before the end of October rather than in February, as provided by the Jacksonville agreement, would be in the public interest as well as in the interest of the operators and the United Mine Workers, is an opinion apparently generally held in administration quarters.

Among the proponents of coal legislation at the last session of Congress emphasis was placed on the probability of an effort to break the union at the expiration of the Jacksonville agreement. This expression of opinion seems to have impressed industry. Fearing that such an effort may be made and that a long drawn-out fight will result, the large consumers of coal are expected to begin building up their stocks long in advance. The one development which can prevent the accumulation of these reserves, it is contended, is the removal of all uncertainty by reaching an agreement at a date much earlier than that specified in the Jacksonville agreement. The second condition of that famous document reads as follows:

"That an interstate joint conference of the Central Competitive Field shall assemble the second Monday in February, 1927, at Miami, Fla., and the president of the United Mine Workers of America and the chairman of this joint interstate conference are authorized and instructed to send out notices at the proper time as to the assembling of the conference."

Showing of Union Output Doubtful

Since February, 1924, when that agreement was signed, the competitive situation has changed to such an extent that there is doubt if full representation of union operators could be obtained for the 1927 conference. If representatives

of the Pittsburgh district, for instance, were to participate they might be unable to speak for all of the tonnage.

The belief also is expressed that were the United Mine Workers and the operators to set themselves seriously to the task of devising some permanent mediation machinery like that adopted by the railroad operators and their men, strikes might be avoided in the future.

Officials feel that it would be nothing short of folly to stage a major labor disturbance at this time when the American economic machine is running at a speed never approached heretofore either here or abroad.

Decries Recourse to Strike

Our prosperity is the envy of Europe. European engineers and business men who are visiting this country in an effort to learn the secret of our success are unanimously impressed with the high wages paid. It would be a national disgrace, it is declared, if one of our basic industries were not able to find some sensible basis for agreement on wage scales rather than resort to the unscientific and foolhardy strike method.

This would be particularly unwise, it is observed, when the union operators already are staggering under the burden of existing difficulties. Under present changed conditions the miners' union could not hope to win in a shorter time than nine months. The non-union mines now are in a position to supply most of the coal needs of the country, except possibly the local demand in Illinois, Indiana, Ohio and a part of the region supplied by Illinois. Pennsylvania now has 2,000,000 tons of non-union production weekly and is in a position to contribute importantly to the fuel requirements of the East.

A spokesman for the operators declares that there is no disposition on the part of the industry to pay other than high wages. In Great Britain, with its high cost mines, there may be some reason for the inability of the industry to pay good wages, but in this country no one has disputed the ability of the coal producers to pay more than a living wage.

With industry operating practically at capacity, in a time of general prosperity, it is expected that employers of

Ohio Operators Stick to Jacksonville Scale

So far no effort has been made by any Ohio operator to start operations on the scale approved by the recently organized Ohio Coal Operators' Association. It is believed that no immediate effort in that direction will be made owing to the increased demand for domestic coal which has enabled a number of the idle mines to resume operations on the Jacksonville scale.

The Board of Directors of the new association has been called to meet at the Neil House, Columbus, Oct. 4 by President S. H. Robbins. The directors will take up a number of matters which have developed since the last meeting.

coal miners will go more than half way in agreeing on a new wage scale that will be in the interest of the Central Competitive Field.

If the two sides are really as anxious as they state to reach a settlement, officials fail to see why a new agreement should not be negotiated early so that business may be spared uncertainty and so that production will not have to be suspended, even if a new scale is negotiated, until industry can eat up abnormal stocks.

Hampton Roads Dumpings Fall Below August Record

Hampton Roads coal piers dumped nearly as large a tonnage during the first two weeks of September as in the first fortnight of last month, which was a record breaker. Coal men believe the September dumpings will be within 20,000 tons of the August mark, but doubt that the present record will be smashed. For one thing, September is a shorter month than August.

During the past two weeks the three sets of piers handled 1,231,141 tons of coal against 1,294,329 tons between Aug. 1 and 15. Norfolk & Western and Chesapeake & Ohio tonnage was greater than during August's first fortnight, but the Virginian was nearly 100,000 tons short. Figures for the three roads are: Chesapeake & Ohio, 422,706 tons, against 420,597 in August 1-15; Norfolk & Western, 515,475, against 472,280; Virginian, 292,960, against 401,452.

Coal agents report that the foreign demand continues and are planning for heavy business as least as far ahead as late fall.

EDITOR'S NOTE—The foregoing Washington letter reflects certain views of official Washington. Due to the fact that policy as a rule prevents government officials from permitting their views being quoted directly, the authority for these reports is necessarily somewhat vaguely referred to. The views reflected are not those of any one group of officials, but of different men, in the legislative and executive departments. There is no necessary connection between their views and COAL AGE editorial policy; neither do they necessarily represent Mr. Wooton's personal views. It is felt that the opinions thus faithfully reflected will be of great interest to the industry. Where opinions are cited from sources outside of the government, the source will be specifically related.

Politics Again Blocks Peace Plans In Strike of British Coal Miners; Government Stands Pat on Offer

The five-month-old suspension of British coal production again entered a political phase this week when debate was opened in Parliament on a motion to extend the emergency regulations first put into effect on the eve of the brief general strike last May. In moving such action, government spokesmen in the House of Commons Monday night openly admitted that the negotiations between the miners and the mine owners undertaken a few weeks ago by Winston Churchill, Chancellor of the Exchequer, and carried on by Premier Stanley Baldwin on the latter's return from a vacation in France had come to grief.

"We have got pretty well to the end of our powers of mediation," acknowledged the Premier, addressing the special session of the House. "We have tried, but our efforts have failed. Although our last proposal has been rejected, the government is perfectly willing that it should stand for a short time yet." Refusal of the mine owners to go along with Mr. Churchill, continued the Premier in a defense of the Churchill program for peace, was an act of stupidity and showed "want of courtesy to the government."

Laborite Assails Government Policy

The course of the government was assailed by former Premier Ramsay MacDonald, leader of the Labor Party, and by former Premier David Lloyd George, spokesman for the anti-Asquith wing of the Liberals. "When the House met the last time," said the Laborite, "I suggested that the government should declare in favor of a national agreement and that that agreement should be negotiated upon an open agenda. But the government has lined up on the side of the mine owners against the strikers."

"Let the government face its responsibilities," declared Lloyd George. "Let the government face the miners and owners and very powerful bodies that have been bringing pressure to bear upon them. If the government will only exercise the powers which it has upon a just settlement, the country will get out of the morass in which it is sinking deeper and deeper. I can see no prospect in the course of several weeks of this trouble ending unless the government takes a very bold and much more courageous and more consistent course."

Mr. Churchill, reviewing his program to incorporate the principles of district agreements into a framework of a national understanding which would meet the objections of both owners and workers, maintained that the skepticism expressed by the latter at the contention that the National Arbitration Tribunal suggested could revise the hours of labor was unwarranted. The opposition members, he said, might wish to toy with the Lloyd George

scheme of taking over the mines, but that "is not the policy of the government. We have no intention whatever in consequence of this dispute of being led into a course of action which would lead to temporary nationalization of the coal industry."

Following the collapse of the earlier Baldwin-Churchill negotiations with the strikers and the mine owners, discussions between the executives of the British Miners' Federation and the coal committee of the Cabinet were resumed on Sept. 22.

Discounts Cook Offer

On Friday (Sept. 24) the Premier addressed a letter to A. J. Cook, general secretary of the miners, stating that the government could not see that the latest proposals submitted by Mr. Cook—involving, it is understood, a temporary return of the men under the national agreement of 1921 with certain other stipulations respecting a national agreement—afforded any means of reaching an early or a lasting settlement of the issues. The government, therefore, stood upon the program outlined in the Baldwin letter of Sept. 17 to Mr. Cook, but could not hold its offer open indefinitely.

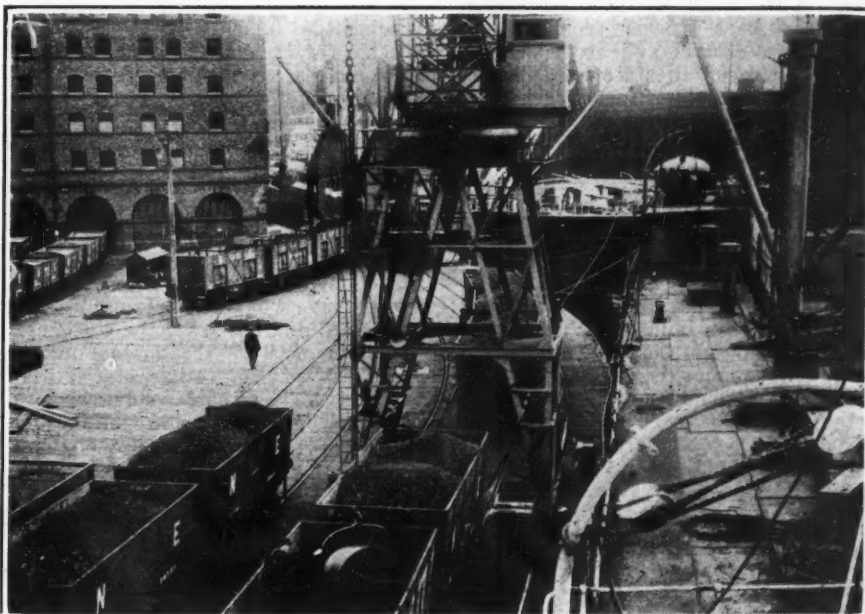
Latest reports indicate that the return of the strikers dissatisfied with their leaders' management of the strike is proceeding at a more rapid rate. In three days the number at work in the Midlands, Lanarkshire and the Forest of Dean was 8,967. The total number now at work in all fields is estimated at 150,000, or more than 10 per cent of the total number of workers employed in 1925.

Merger of Dock Interests On Upper Lakes Indicated As Coal Officials Confer

Reports of a probable consolidation of interests by coal-dock operators at the Head of the Lakes have been in the air since the meeting at Duluth, Minn., on Sept. 18 of a group of prominent officials of Eastern coal companies, who made a study of the dock situation. The party was headed by Frank E. Tapin, chairman of the board of the Pittsburgh Terminal Coal Corporation and president of the North American Coal Corporation and of the Inland Coal & Dock Co., Duluth. Others in the group were C. W. Watson, president, Consolidation Coal Co.; William Warden, chairman of the board, Pittsburgh Coal Co.; F. J. Hartwell, of Chicago, president, Berwind Fuel Co.; W. C. Atwater, New York, president, W. C. Atwater & Co., and C. E. Kendrick, Minneapolis, vice-president, Inland Coal & Dock Co. After an inspection of the dock facilities the officials held a conference in Mr. Taplin's private car.

While in Duluth the visiting officials made no announcement of any changes in their business policy, but it was indicated that a consolidation program may be effected within the coming year. It is generally agreed that dock capacities at the Head of the Lakes are far in advance of the demand and that overhead expenses are too high.

John J. Steinbugler, of New York, secretary of Atwater & Co., said before the party left the city that the costs of operating the docks are excessive by reason of their over-capacity and that coal company officials are therefore making a study of the situation with a view to eventually working out some consolidation plan that would place the trade in a stronger position.



Carrying Coals to Newcastle

Shipments of foreign coal to the Tyne are arriving in increasing numbers as the strike of British miners drags on. Local shipping interests shake their heads sadly when they contrast present conditions with the heavy coal traffic in the opposite direction in normal times. The above picture shows a huge cargo of American coal being discharged at Newcastle.

Wide World Photos

Western Governors Seek State Control Of Mineral Resources on Public Lands; Smith Defends Leasing of Coal and Oil

By A. H. Hubbell

Managing Editor, *Engineering and Mining Journal*

During the course of the Western States Joint Convention at Denver, Sept. 20-23, great dissatisfaction was expressed by several Western men at the manner in which the mineral lands of the West are being handled by the United States Government. Four organizations co-operated in this meeting, the Western Division of the American Mining Congress, the American Institute of Mining & Metallurgical Engineers, the American Silver Producers' Association and the American Association of Petroleum Geologists.

At Monday's session Jesse F. McDonald, governor of the Colorado Chapter of the American Mining Congress and one-time Governor of the state, presided. Two of the speakers, Governor Dern, of Utah, and Congressman Charles E. Winter, of Wyoming, presented the Western view. The federal government's side was supported by the Secretary of the Interior, Hubert Work, and the Commissioner of the General Land Office, William Spry.

The West has a grievance, as the remarks of Governor Dern and Representative Winter quickly made plain. It does not like the present leasing law and will oppose any extension of it. It resents the collection of royalties from the public lands by a federal landlord.

No Discrimination

It urges that there should be no discrimination between Eastern and Western states. In the East the public lands have long since passed into private ownership, and they yield taxes accordingly to the states of which they are a part. In the West vast areas, it seems, are to be kept forever from coming under state control and from thereby becoming subject to state taxation.

The Western states feel that in this respect they are not sovereign states within their respective boundaries. They aver that it is unjust that land within their borders should be held and administered "for the common good" of all the states, including New York and Pennsylvania. It may be that Western sentiment in these respects is not yet sharply crystallized, but it is evident from the addresses made and the way in which they were received that public opinion is gradually forming, and by some the matter is expected soon to become a political issue.

That the federal government can well continue to administer the national forests as a service in return for taxes paid is an opinion generally expressed, but its seemingly strong reluctance to pass title to public land under any circumstances, if it can possibly prevent it, is contrasted unfavorably with its former attitude, when it was eager to get the land settled and the mineral wealth developed. Then the only question was whether the title to the deposit was in compliance with the law.

Governor Dern dealt with the sub-

ject from a local viewpoint, talking specifically on school land titles in his state. Representative Winter's speech expressed what was perhaps a rather extreme view of the situation in the West in general and in Wyoming in particular.

When Utah became a state, four sections in each township within its borders were granted it, by the enabling act, for the support of common schools. This, said Governor Dern, would have yielded substantial revenue for the schools without a crushing burden of taxation. But after the passage of the enabling act and the adoption of the Constitution, the federal government began to undo the work of Congress by



George Otis Smith
Director, U. S. Geological Survey

claiming that lands known to be chiefly valuable for mineral were not included in the grants. It took the position that while the enabling act did not specifically reserve minerals, neither did it specifically grant them, and that therefore they were reserved. This, said Governor Dern, was the beginning of Utah's school land problem, over which it has been sweating ever since.

"What we want is that Congress shall confirm its original grants so that we may have what was originally given us, mineral and all," said the Governor. "In asking this we are not asking for special favors that other states have not received." Other commonwealths, including Michigan and Minnesota, which were admitted under enabling acts containing almost the identical language of the Utah act, had received and kept their minerals. Michigan had got the great copper and iron mines found in her school sections. Minnesota had received the iron mines; and the revenue from mineral, timber and agricultural lands had now been put into a trust fund of \$57,000,000. Oklahoma in 1925 collected \$991,000 in bonuses, rentals and royalties from her mineral lands, which belonged to the state, and had accumulated a fund

of nearly \$9,000,000 from this source.

In Utah they were just as good conservationists as the national government, said Governor Dern. The state had a mineral-land leasing law under which all minerals in state lands were reserved to the state, and when it sold a piece of land it sold only the surface. This, he pointed out, showed that the federal government could not justify its course on the ground that it was saving natural resources from the spoiler.

The federal government had made matters worse by its rule of geological inference; thereby, if a bed of coal were exposed on the side of a mountain, all lands into which the beds might extend were considered coal lands and therefore reserved. However, although it took lands away from the state by such geological inference, it would not let the locator of a claim get a patent on geological inference; instead he must have the mineral in place. Other technicalities which were turned to advantage by the federal government in order to take away from the state the minerals on the school section in each township were cited by Governor Dern.

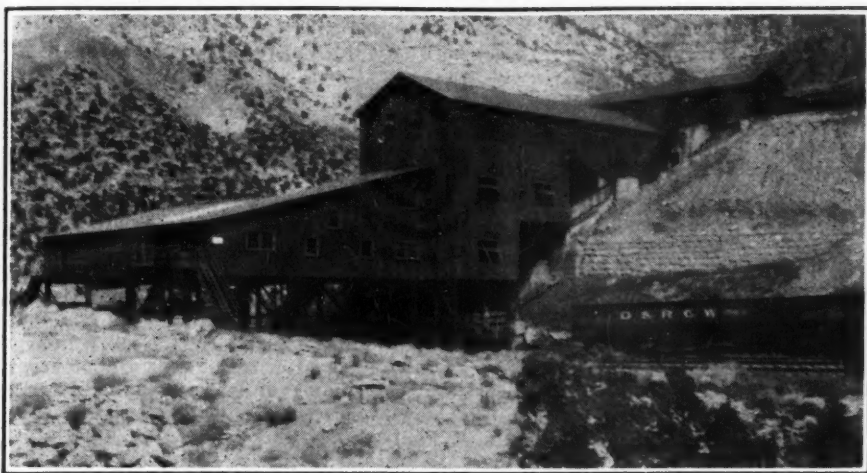
Further, as a result of the contests instituted by the government, the state was involved in endless hearings in which the federal government was at once prosecutor, judge and jury. And where the state had sold a school section, the purchaser could not be sure of a valid title, for at any time the federal government might challenge it on the ground that the land was mineral.

Want More Sovereignty

Governor Dern said that he indorsed the doctrine that state sovereignty is the nation's strength, as outlined by President Coolidge in Denver on Aug. 3, as well as the doctrine that strong states are vital factors in our national policy, uttered by the Governor of Maryland last April. "It is refreshing to us Westerners to hear these wise words coming out of the East," said Governor Dern. "Let us hope that they will be backed up by actions that will give the public-land states of the West a little more sovereignty and a little more of the local self-government which the President lauds as our chief treasure. The people of Utah would be glad if they could exercise sovereignty over the land within the boundaries of their state. Three-fourths of its area belongs to the federal government. The situation is similar in all the Western states. In Arizona 67 per cent of the area of the state is still in federal control; in New Mexico 43 per cent; in Idaho 67 per cent; and in Nevada 87 per cent. We are not sovereign states, but are under the paternalistic control of Uncle Sam in an important degree."

Describing the public-land situation as he saw it, Congressman Winter said that of the unreserved and unappropriated public lands only 184,000,000 acres was left—naturally the poorest of all the country's lands. Ninety-seven per cent of this was in the eleven Western states. The acreage permanently withdrawn from acquisition by private ownership and forever reserved was in round numbers 200,000,000 acres.

The mineral-leasing law should be repealed, Representative Winter sug-



At One of the Large Mines of the Rocky Mountain Region

This tipple was built to dump and prepare the coal of the Columbia Steel Corporation for use in byproduct coke works at Ironton, Utah, where the coke is used to smelt iron from another part of the same state. The town and mine, both in Utah, take their name, Columbia, from the steel company.

gested in closing, and the country should proceed, as before, under the general mining law, with such amendments as might be necessary to meet conditions today. If the leasing law could not be repealed, inclusion of other and additional minerals under it should be resisted. He urged that the title to all school-land sections should be settled now and confirmed in the respective states. All legislation that would tend to bring all lands with their resources, except national parks and monuments, into state or private ownership, development and taxation should be consistently pressed. After 40 years, the federal government should be retired from the land business.

Explanation of the federal government's attitude toward the public lands was made by Secretary Work. It was not his purpose to forecast the action of Congress, he said, or to advocate a reversal of the government's present policy in its entirety, but to open the subject for discussion. The Mineral Leasing Act passed in 1920 assumed that the people hold a continuing interest in the country's natural resources, and so the rights were leased instead of sold.

The act, of course, did not apply to the mining of gold, silver, copper, lead, zinc and other metalliferous ores. Of the royalties 37½ per cent and 5 per cent of the net proceeds from the sale of public lands were turned back to the state government in which the lands are located. Fifty-two and one-half per cent of the royalties and about 60 per cent of the receipts from the sale of lands went into the Reclamation Fund to be used in the West, but only 10 and 35 per cent respectively reverted to the U. S. Treasury.

Would State Mismanage?

He was convinced, the Secretary said, that the federal government was administering more and the state less of the activities of government than they should. But what would become of the public lands and their resources if administered by the states? What had become of public lands already released to them? Which would be the least vulnerable to local influence: The federal government or the state? How many of the newer states could actually

afford to own and administer the public lands within their borders?

"Whether there should be a fundamental change of policy involving this public trust is a question of national importance and not alone of local interest," said Dr. Work. "The outright gift of the minerals in the school lands granted to the states means a permanent release by the United States of natural resources that belong to all the people of the country.

"Unlike the mineral leasing law covering non-metalliferous minerals, and under which the minerals remain the property of the United States, the federal mining laws provide for the disposition of the land itself, as well as the minerals found in it. I know of no valid reason for changing these statutes," said the Secretary.

A.I.M.E. Program

On Wednesday the American Institute of Mining and Metallurgical Engineers had a varied program, Samuel A. Taylor being the first speaker and discussing aspects of the coal-mining industry. H. Foster Bain, secretary of the Institute, followed with a paper saying that the future demands for minerals would increase with the worldwide rise in the standard of living, which had already stimulated the consumption of minerals.

George Otis Smith in his paper on the "Ever-New West" said in the course of his remarks:

"I wish to express my conviction that extension of the government's leasing plan to metal mining is not warranted. The search for gold and silver, copper, lead and zinc on the public domain still continues to be a project well suited to individual effort and private initiative. The citizen of wide experience but modest means is still able to finance his own prospecting expedition and, when he finds a promising ledge, to carry on the necessary development work without appealing to some large corporation to take over the task. In short, the individual man living in the region may create a mining property in his own right—not merely serve as the locator or agent of an absentee corporation. In later stages of the development of the property he may need

to organize a company of his own or arrange with some neighboring company to work the mine; but finding and making the metal mine can be a private enterprise, for little mines can pay as well, if not as much, as big ones.

"This is quite a different story from the present-day development of coal mines and oil properties, for to be successful they need to be worked by operations on a large scale conducted by well-financed corporations; and in the public interest the relation of the government to a powerful corporation may well be based on a different plan from that which determines its relation to an individual citizen.

Fuel Must Serve

"Another difference between the metallic resources of a state like Colorado and its supplies of mineral fuels or its water resources lies in the much larger public interest which attaches to the sources of energy, whether coal, oil or water. Upon the proper utilization of these power resources depends the general prosperity of the future, including, I might add, the welfare of the metal-mining industry itself, so that the public wisely asks that the government maintain over these particular resources a certain degree of control, which seems to be effected by the present leasing laws properly administered. I do not foresee a similar need of public regulation of the precious-metal deposits of Colorado or even of its lead and zinc mines.

"The West is moving fast in these later days. It was my privilege this summer to see a coal mine in Montana where man-power was supplemented by hydro-electric power, to the extent that a giant shovel mines 6 tons of coal at a bite and loads it on a railroad car, all in less than a minute. A pit crew of 37 men is thus able to handle an output of 3,750 tons in a working day—a hundred tons to the man.

"Compare this up-to-the-minute plant with another coal mine, operated by the same company, that I knew intimately 25 years ago. That was the third largest mine in the West and was for that day modern in equipment and altogether progressive in management. Yet at that mine each man produced less than 2½ tons of coal a day and his day's output was worth \$3.82 at the mine. No machine helped that miner until his car was loaded and delivered to the main haulageway—his 2½ tons represented unaided man-power.

Gave U. S. \$15,000

"This most modern coal mine in Montana, like the better-known copper mine in Utah, will not long be unique—profit-making efficiency is likely to be soon copied. A part of the area covered by the operations of this strip mine is public land, so that about \$15,000 in royalty will be paid this year into the state and federal treasuries, yet there is a far larger public benefit that comes from this efficient use of Montana water power in the mining of coal, for the railroad using this cheaply mined coal reports a saving thereby last year of \$700,000. This is certainly a worthwhile contribution of progressive mining to transportation, and the cheapening of transportation must ultimately benefit agriculture."

Trade Commission Fishing Gets Setback

That the Federal Trade Commission, in a fact-finding investigation, is not authorized to require by compulsory processes oral testimony or production of private books and papers was held in an opinion rendered Sept. 22 by the Supreme Court of the District of Columbia. The opinion was delivered by Judge James F. Smith of the Court of Customs Appeals, sitting as an associate justice of the Supreme Court of the District of Columbia.

The case arose as the result of an investigation instituted by the Commission pursuant to a Senate resolution directing an investigation of the flour-milling and bread-baking industries. Subpoenas had been served by the Commission requiring individuals to appear and testify and demanding the production of books and papers of the Millers National Federation and corporate members of the Federation. Application for injunction was filed by the Federation and the Court's decision will prevent the enforcement of the subpoenas.

The Court's opinion holds that the power to use compulsory processes in obtaining information or provide records must be limited to judicial or quasi-judicial proceedings where opportunity for hearing and defense are offered and that the compulsory processes of subpoenas cannot be invoked in fact-finding investigations.

The case is somewhat similar to that of the Maynard Coal Co. and Claire Furnace Co. cases, in which the Commission was denied the right to compel

Fourth Coronado Coal Co. Trial Impends

West Virginia legal talent and experience in labor cases in the courts is to be utilized in the fourth trial of the nationally known Coronado Coal Co. suit against the United Mine Workers. T. C. Townsend, chief counsel in West Virginia for the miners, has gone to Fort Smith, Ark., to assist counsel of the international union. The suit is for the purpose of recovering damages under the Sherman act for the strike in Arkansas field in 1914. The first two verdicts, one for the company and one for the union, were reversed. A third trial ended with a disagreement of the jury.

coal and steel corporations, respectively, to furnish monthly reports of production, costs and profits. The Claire case is now awaiting decision by the Supreme Court and the Maynard case is pending in the Court of Appeals of the District of Columbia.

Shortage of funds, the Trade Commission reports, has made it necessary, temporarily, to materially restrict the work of the inquiry concerning open price associations. On March 17, 1925, the Senate directed the Commission to investigate the number and importance of open price associations, the effect of their activities on prices and the nature of their other activities with particular reference to alleged violation of the anti-trust laws.

Thompson Ends Long Term On Trade Commission

Huston Thompson of Colorado completed his term as a member of the Federal Trade Commission and retired to private life on Sept. 25. It has been understood for some time he would not be reappointed, but there has been no pronouncement from the White House as to his successor.

Mr. Thompson, who has served on the Commission longer than any other member, was appointed first to that body by Woodrow Wilson in January, 1919, for a brief term, and in September of the same year was reappointed for a seven-year tenure. He twice served as chairman, from Dec. 1, 1920, for one year, and from Dec. 1, 1923, for another twelve months' period.

Ames and Vincent Resign; Duncan Succeeds Latter

The resignations of Wes Ames and H. H. Vincent, as president and secretary-treasurer, respectively, of District No. 23 of the United Mine Workers, comprising western Kentucky, have been accepted by John L. Lewis, international president. W. D. Duncan, international board member, has been designated by Mr. Lewis as acting secretary-treasurer and has taken over union property in western Kentucky.

Messrs. Ames and Vincent announced their retirement several weeks ago. Miners in Muhlenburg County have been working on practically a non-union basis for several years and only the skeleton of the old organization is intact in western Kentucky.

Coal Produced in West Virginia in 1925¹

(Exclusive of Product of Wagon Mines)

County	Loaded at Mines for Shipment	Net Tons Used at Mines			Total Quantity	Value		Number of Employees				Average Number of Days Worked	Average Tons per Man per Day	
		Sold to Local Trade and Used by Employees	for Steam and Heat	Made Into Coke at Mines		Total	Average per Ton	Miners, Loaders and Shot-firers	Haulage and Track	All Others	Surface			
Barbour.....	2,038,587	31,569	9,087	19,750	2,098,993	\$3,012,000	\$1.43	1,528	295	182	242	2,247	188	4.97
Boone.....	3,292,748	33,789	7,606	.....	3,334,143	5,210,000	1.56	1,751	508	339	467	3,065	219	4.97
Braxton.....	247,339	25,469	5,072	.....	277,880	409,000	1.47	317	37	88	90	532	174	3.01
Brooke.....	768,102	163,608	100	.....	1,531,810	3,234,000	2.11	1,045	209	134	143	1,531	178	5.62
Clay.....	990,246	10,758	9,820	.....	1,010,824	1,693,000	1.67	463	128	160	173	924	251	4.36
Fayette.....	10,355,662	127,256	47,345	304,704	10,834,967	20,971,000	1.94	6,435	1,757	1,602	1,681	11,475	224	4.21
Gilmer.....	128,152	3,101	4,732	.....	135,985	187,000	1.38	61	22	6	22	111	257	4.77
Greenbrier.....	1,282,559	46,884	6,597	.....	1,336,040	2,236,000	1.67	547	145	208	173	1,073	209	5.97
Harrison.....	5,944,092	233,024	1,622	.....	6,178,738	8,867,000	1.44	3,972	763	664	823	6,222	187	5.32
Kanawha.....	5,383,248	136,988	24,394	.....	5,544,630	8,703,000	1.57	3,550	1,014	561	941	6,066	208	4.39
Lewis.....	23,305	30,456	4	.....	53,765	96,000	1.79	69	12	9	13	103	159	3.27
Lincoln.....	207,475	2,755	990	.....	211,220	320,000	1.52	232	40	25	74	371	140	4.07
Logan.....	20,173,217	268,126	10,669	.....	20,452,012	31,219,000	1.53	6,894	1,989	2,013	2,054	12,950	263	6.00
McDowell.....	20,418,936	167,855	141,019	219,181	20,946,991	40,442,000	1.93	8,250	3,174	3,509	4,354	19,287	225	4.83
Marion.....	4,521,252	65,433	72,658	26,456	4,685,799	8,072,000	1.72	3,390	793	856	750	5,789	172	4.72
Marshall.....	1,701,131	127,399	16,165	.....	1,844,695	3,477,000	1.88	1,151	168	153	170	1,642	240	4.67
Mason.....	18,144	31,055	725	.....	49,924	106,000	2.12	62	9	14	13	98	135	3.77
Mercer.....	3,772,614	29,120	8,107	78,222	3,888,063	7,390,000	1.90	1,599	667	441	814	3,521	240	4.61
Mineral.....	292,900	4,859	2,806	.....	300,565	548,000	1.82	399	54	53	88	594	148	3.41
Mingo.....	5,800,111	33,582	5,241	.....	5,838,934	8,837,000	1.51	2,034	741	790	812	4,377	249	5.35
Monongalia.....	8,399,267	154,557	.....	14,346	8,568,170	12,804,000	1.49	4,394	778	657	712	6,541	241	5.43
Nicholas.....	196,368	9,927	7,037	.....	213,332	390,000	1.83	238	62	28	73	401	198	2.68
Ohio.....	2,219,491	288,629	7,038	.....	2,515,158	4,711,000	1.87	1,754	259	217	204	2,434	234	4.42
Preston.....	1,773,583	18,599	5,195	131,024	1,928,401	3,416,000	1.77	1,157	323	148	281	1,909	218	4.63
Putnam.....	233,377	2,016	1,076	.....	236,469	363,000	1.54	275	80	75	64	494	260	1.84
Raleigh.....	11,949,948	111,081	67,613	.....	12,128,642	22,716,000	1.87	5,118	2,162	1,281	1,681	10,242	241	4.91
Randolph.....	569,390	19,363	2,935	8,421	600,109	951,000	1.58	450	101	55	84	690	173	5.01
Taylor.....	1,152,844	13,077	454	.....	1,166,375	1,572,000	1.35	793	66	103	141	1,103	223	4.75
Tucker.....	1,017,205	7,494	41,585	4,046	1,070,330	2,032,000	1.90	515	132	66	77	790	261	5.19
Upshur.....	803,005	15,413	13,696	.....	832,114	1,106,000	1.33	448	97	72	85	702	222	5.33
Webster.....	32,600	5,658	50	.....	38,308	82,000	2.14	65	18	8	9	100	128	3.00
Wyoming.....	2,235,640	18,707	14,354	.....	2,268,701	4,036,000	1.78	1,191	604	256	473	2,524	214	4.19
Other counties ²	249,136	1,421	8,315	.....	258,872	447,000	1.73	176	33	22	50	281	205	4.49
Total.....	118,191,674	2,839,028	544,107	806,150	122,380,959	\$209,655,000	\$1.71	60,323	17,240	14,795	17,831	110,189	225	4.94

¹The figures relate only to active mines of commercial size that produced coal in 1925. The number of such mines in West Virginia was 1,173 in 1925, 1,220 in 1924 and 1,666 in 1923.

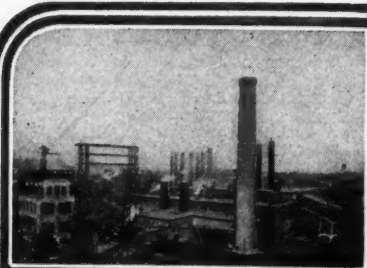
Methods of mining in 1925: The tonnage undercut by hand was 17,471,370; shot off the solid, 3,821,151; cut by machines, 100,786,542; mined by stripping, 272,082; not specified, 29,814.

²Size classes of commercial mines in 1925: There were 25 mines in Class 1A

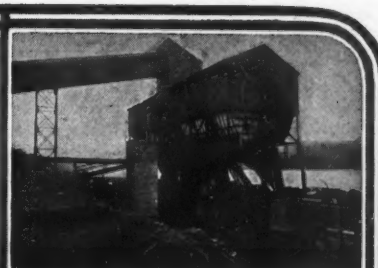
(500,000 tons and over), producing 12.2 per cent of the tonnage; 169 mines in Class 1B (200,000 to 500,000 tons), producing 39.8 per cent; 234 in Class 2 (100,000 to 200,000 tons), with 27.2 per cent; 226 in Class 3 (50,000 to 100,000 tons), with 13.1 per cent; 321 in Class 4 (10,000 to 50,000 tons), with 7 per cent, and 198 in Class 5 (less than 10,000 tons), with 0.7 per cent.

³Grant, Hancock and Wayne.

Compiled by U. S. Bureau of Mines.



News Items From Field and Trade



ALABAMA

To Enlarge Byproduct Plant.—The byproduct plant of the Alabama By-Products Co., at Tarrant City, near Birmingham, will soon be enlarged, it is learned. Morris Bush is president of this company.

New Equipment Planned. — The Yolande Coal & Coke Co., with general offices in the Brown-Marks Building, Birmingham, is actively engaged in reopening its mines at Connellsville, near Bessemer. About \$400,000 will be spent for new equipment. The contract for driving the mine slope has been let and bids have been asked for a new steel tippie, steel skips, hoisting engines and mine cars. The capacity of this mine will be 1,600 tons of coking coal daily. The officers of this company are J. B. McClary, president and general manager; J. L. Davidson, vice-president; Henry Marline, secretary-treasurer.

The Davis Creek Coal & Coke Co., which operates a group of coal mines near the Yolande development, is building a \$400,000 coal washer. J. B. McClary is president and treasurer of this company.

ARKANSAS

The McMillan Brothers Coal Co., north of Branch, which was in the hands of a receiver, has been taken over by Judge McKinley, of El Paso, Texas, who will start operations on the coal leases at once.

CALIFORNIA

Mt. Shasta Company Plans Outlet.—The Mt. Shasta Coal Co., which has partially developed a coal property in Shasta County, has tentatively selected a site for its mine outlet and townsite. G. W. Evans of Seattle has been engaged to advise on detailed plans for equipment and operation. The company has acquired 16,000 acres of coal lands and has developed a small area. A branch railroad extending from Redding to the mine three miles east of Ingot will be constructed if present plans mature. Thirty men are now employed. G. H. Reese is superintendent.

ILLINOIS

Output Increasing.—Coal mines in Illinois produced 4,778,413 tons of coal during August, according to the monthly report of A. D. Lewis, director of the state Department of Mines and Minerals. This compares with a total of 4,268,197 tons in the preceding month and 5,293,423 tons in August, 1925. Of last month's output, 4,479,423

tons was produced by shaft mines and 298,990 tons by stripping operations.

Mine No. 19 of the Industrial Coal Co., West Frankfort, established a new company output record of 3,230 tons for an eight hour shift Sept. 3. The old record, made in April, was 3,221 tons. There were only four minutes delay in the hoisting of men on the cages. This mine uses much smaller cars than any other mine in southern Illinois, hence more dumps are necessitated during the day to produce the volume.

Gus Blair, Murphysboro, has purchased the old Blair No. 2 mine, near that city, and reclamation work is in progress. About one hundred men will be employed.

A. N. Poli, a practical miner from Springfield, has purchased the old Garvin mine, three miles northeast of Paris. The mine has been operated for the last two or three years by the Edgar County Coal Co. Mr. Poli has taken the mine under a one-year lease, with an option for a renewal for five years. The property has been closed for the last few weeks, but it is expected that it will be reopened at once.

The Consolidated Coal Co., St. Louis, Mo., has reopened its mine at Herrin, employing approximately 700 men.

Seek to Correct Credit Evils.—The Chicago Coal Merchants' Association discussed credits pro and con at a luncheon meeting at the Hotel La Salle Sept. 28. A round-table talk featured the gathering which was given over entirely to the discussion of extension of credits. The credit question is a live one in the retail trade of Chicago. Many companies have been charged with violating all the principles of sound merchandising on credits during the last five or six months. Credits actually reached the stage of competition and the meeting of the dealers was aimed at correcting the situation. No action was taken but everybody present condemned the practice of extended credits.

The Chicago Coal Merchants' Association has the following two new members: South Shore Coal & Teaming Co., 2811 East 82nd Street and the Burnside Coal Co., 9256 Cottage Grove Avenue.

The Chicago coal trade raised \$5,000 for the Florida relief fund. That was the quota set at a meeting of the general relief committee of the Chicago Association of Commerce, Mayor Deever and representatives of the coal men. Those present at the meeting representing the coal trade were C. M. Moderwell, W. E. Hill, A. F. Hooper, O. M. Fox and A. Mitchell. Herbert Taylor was selected to notify the operators; W. E. Hill, the retailers, and

John McCabe, the wholesalers. Checks were made out of the American Red Cross and sent to the Chicago Coal Merchants' Association headquarters.

Aid for Idle in Southwest.—Financial relief for 12,000 striking coal miners of District 21, United Mine Workers, which includes Texas, Oklahoma and Arkansas, was voted by the Illinois Federation of Labor at the recent state convention in Streator. Some striking members in the Southwest have been out of work for four years, withstanding an attempt to establish the 1917 scale of wages.

The Chicago Coal Merchant's Association has been re-admitted into the National Retail Coal Merchants' Association.

INDIANA

A certificate announcing the abandonment of its mine in the southwestern part of Vigo County has been filed by the Hein Coal Co. The date of abandonment was given as March 22, last.

The Little Fork Mine Co. has filed articles of incorporation for taking over the Schepferman shaft at Ehrmanndale, near Terre Haute. The mine will be reconditioned and the company reorganized. It is planned to place equipment to produce 1,200 tons daily. The incorporators are William L. Williamson, Fred Wood, Charles W. Cole and Clarence A. Gilbert.

T. C. Bugg, well known coal man of Evansville, has returned from a trip through Warrick County and Gibson County, and it is reported that he has recently taken a number of options on coal lands.

Improvements started several months ago at Stock's mine, at Chandler, have been completed and the mine now is being operated steadily.

IOWA

A new bed of coal has been located on the James Williams farm, near Eldora. The seam is 5 ft. thick and is 108 ft. down.

Shuler Bond Issue on Market.—The Charles Shuler Investment Co., of Davenport, of which the Shuler Coal Co., of Des Moines, is a subsidiary, has just put on the market a bond issue of \$600,000. The company sets forth that the security for the bonds has an appraised value of more than \$1,250,000. Listed in the securities are \$300,000 of first mortgage 10-year sinking-fund gold bonds of the Shuler Coal Mining Co., an Illinois corporation, and the same amount of similar bonds of the Shuler Coal Co. of Des Moines. The proceeds it is stated, will be used to

retire bank indebtedness of the company and subsidiaries, and to provide ample working capital.

KENTUCKY

Ohio River Coal Traffic Heavy.—A high stage over the summer has resulted in an uninterrupted movement of coal on the Ohio River this year. Hardly a week passes without one or more tows going by water from the Kentucky River or Kanawha River fields to Louisville, Ky., and New Albany, Ind.

Big Tract Changes Hands.—Mont Lowe and William Slater on Sept. 8 purchased for \$20,100 at a sheriff's sale a total of 1,228 acres of fine coal land on Big Creek, twenty-five miles from Pikeville and four miles off the Norfolk & Western R.R. The property, which is a part of the O. B. M. Lowe estate, was sold last year for \$37,000, the sale later being set aside. The property contains several seams of coal, one being 6-ft. thick, but a four-mile track will have to be built to reach the acreage.

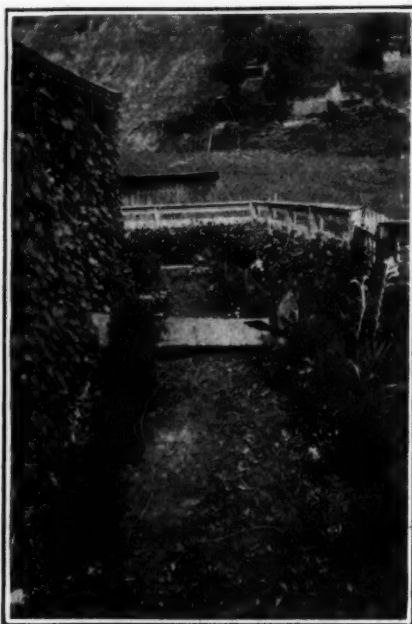
Bell Coal Field to Be Mapped.—The coal fields of Bell and Whitley counties will be among the first to participate in the expenditure of funds for the topographical survey to be made of the unmapped portions of Kentucky, according to Dr. Willard Rouse Jillson, state geologist. The topographical survey in these counties will be started this year under his direction, Dr. Jillson said. Through an arrangement with the Department of State Roads and Highways \$50,000 was set aside to be used in base-mapping the parts of the state which have not been given a complete topographical survey. A like amount will be given by the federal government, which will co-operate with the Kentucky Geological Survey. No work of this kind has been done in the coal fields, Dr. Jillson said, and the completion of the survey will give industries seeking locations an opportunity to study advantages offered in this part of the state.

The General Light & Power Co., of Chicago, Ill., has purchased a county franchise in Hopkins County giving it the right to construct a power line along and across county highways. The company will construct a power line in north Hopkins. The concern already operates lighting plants at Calhoun, Corydon, Sebree and Slaughters.

To Rebuild Wakenva Tipple.—The Wakenva Coal Co. plans the rebuilding of the tipple at its operation near Hazard recently partly destroyed by fire. The loss was approximately \$50,000, including equipment.

OHIO

Eastern Ohio Mines Speed Up.—C. J. Albasin, Commissioner of the Eastern Ohio Coal Operators' Association is authority for the statement that 2,100 men have returned to work recently in the district and more are scheduled to receive employment. The Lorain Coal & Dock Co., of Columbus, which opened its Stanley mine several weeks ago, is now preparing to open the Lincoln mine, which will make four large operations



Best Looking Yard, Toms Creek Virginia Iron, Coal & Coke Co.

This yard which took first prize at the annual contest of the company at Toms Creek Colliery is that of N. D. Pope.

of that company active, as the Crescent and Blaine mines have been operated during the summer months. In all, eight large mines have resumed in the past two or three weeks.

Harpersville Mine Resumes.—Mine No. 3 of the Jefferson Coal Co., at Harpersville, Jefferson County, which employs 300 men when in full operation, resumed operation Sept. 21 under the Jacksonville scale after being idle since early last May.

Harmon Mines Operating.—The Hamleyford Coal Co., organized a year ago, with W. S. Harmon of the W. S. Harmon Coal Co., of Columbus, at its head, has placed in operation two large mines having a capacity of 1,200 tons daily. They are located at McCuneville and Redville. Another mine, to be equipped with a picking table and tipple with conveyors and shaker screens will be ready for operation in six weeks. This mine, which is located at Baird's Furnace, will have a capacity of 1,000 tons daily.

Sunday Creek Wins Suit.—The Sunday Creek Coal Co., in its litigation with the North Hill Coal Co., the Big Baily Mining Co. and the Carr Run Coal Co., has won a signal victory in the lower courts with a judgment for approximately \$35,000 and costs rendered against the three concerns. An attempt to appeal to the Circuit Court of Appeals was refused. With the judgment pending the three companies had receivers named and now the Sunday Creek Coal Co. has gone into the federal court to have them adjudged bankrupts. The litigation started over a contract with the three companies for the sale of coal produced which it is alleged they disregarded and sold through other agencies. The original suit was for an accounting of such sales.

The Ohio Collieries Co. has resumed operations at Mine No. 255 near Athens, which had been idle for several

months. This makes three large operations which are being worked by that concern.

PENNSYLVANIA

To Use Coal Lump for Monument.—One of the largest lumps of bituminous coal ever taken from a mine in central Pennsylvania was removed recently from a working of the Reitz Coal Co. at Windber. The big lump weighed 4,300 lb. and is of the so-called smokeless variety. It was donated to State College for the department of mines and metallurgy and will be utilized in the construction of a monument on the college campus. A large lump of anthracite also is to be obtained for the same purpose.

Fifteen salesmen, with their sales manager, H. M. Buggeln, of Scholle Brothers, investment bankers of New York City, were guests of the Cosgrove-Meehan interests in Johnstown two days last week. With the officers of the firm in Johnstown, the visitors inspected Thermal mines Nos. 8 and 15, located at Homer City and Dilltown, respectively. A corn roast at Sulphur Springs ended the entertainment of the visitors. Thermal mines Nos. 5 and 10, in Somerset County, also were visited.

John Lochrie, Sr., one of the leading coal operators in the Windber district, suffered a heavy loss as a result of the hurricane which hit the east coast of Florida. Mr. Lochrie is lessee of the Broward Hotel at Fort Lauderdale, a four-story brick building, which was badly damaged and will practically require rebuilding. Four dwellings owned by Mr. Lochrie were not much damaged. Mr. Lochrie had leased the hotel for a period of ten years. It was the largest hotel in Fort Lauderdale.

Frick Fires 150 Ovens.—Orders were issued last week to fire up 150 additional ovens at Continental No. 1 plant of the H. C. Frick Coke Co. at Uniontown. Superintendent Metz has been busy getting the ovens in operation. When these ovens are fired Continental will have 260 in operation.

Dry Cleaning Plant Ready to Open.—Work on the construction of a modern dry cleaning coal tipple, the largest of its type in the world, is nearing completion at Mine No. 37 of the Berwind-White Coal Mining Co., Windber. The machinery is being tested and it is expected the plant will be in full operation by Oct. 1. The structure will have a capacity of 3,000 tons of coal daily. It is entirely of steel construction. There are fifteen coal-cleaning tables, automatically controlled, a high-speed rotary dump, three large dust collectors, horizontal shaking screens and two twin coal elevators. Construction was started on April 1.

Shipments of bituminous coal (revenue) by the Reading Co. during July last totaled 1,476,238 gross tons. This compares with 1,463,308 tons transported in the corresponding month of 1925.

The Indian Creek Valley Mine Drainage Co. is making excellent progress in the driving of a tunnel in the coal, which will drain the water from the Melcroft, Sagamore and Indian Creek mines, in western Pennsylvania, to a

point below the dam of the Mountain Water Supply Co. About 30 per cent of the tunnel, on which work was commenced in March and which will extend about 36,000 ft., is completed, and it is expected the entire job will be done in May, 1927. Wherever the question of stream pollution is under consideration the progress of this undertaking is being watched with interest and the success of the operation will be a matter of general concern.

Cokeburg Mine to Reopen.—Semi-official announcement was made last week that the Cokeburg Junction mine of the Acme Coal & Coke Co. would be reopened soon after an extended shutdown.

to participate in one of the bloodiest battles ever fought in the history of mining in this state. Twelve company guards and a West Virginia sheriff were slain and seven union miners died on that day. Hundreds of miners were later arrested in Washington County, Pa., and taken to Wellsburg, county seat of Brook County, W. Va., where 210 men remained in jail for a month. Thirty others were sentenced to three-year terms, seven to terms of four to seven years and six to eight-year terms. All but one have been released on parole.

Logan County is expending more than \$9,000 in public health work this year and the Island Creek Coal Co.,

folk & Western Ry.; J. V. Norman, of the law firm of Norman, Quirk & Graham, Louisville, and Douglas Malloch, Chicago humorist, will be the principal speakers at the dinner which will mark the close of the annual meeting of the Operators' Association of the Williamson Field, to be held at the Mountaineer Hotel, Williamson, Oct. 1. The afternoon session will be devoted largely to the annual reports of the officers and the executive, statistical and freight-rate committees of the association.

The West Virginia Public Service Commission is hearing the protests of residents of the Princeton coal fields, who seek to have two passenger trains serving the mining towns retained by the Virginian Ry. The railway company wants to discontinue the service.

The Alma Coal Co., of Huntington, has been dissolved, according to a certificate filed in the office of the Secretary of State. L. T. Vinson, of Huntington, was vice-president of the company.

The annual meeting of the Kanawha Operators' Association will be held at Charleston on Oct. 21.

WISCONSIN

The Stott Briquet Co. now has its enlarged briquetting plant at Superior in full operation. The additional equipment will enable the company to increase its output 50 per cent this season.

CANADA

Hillcrest Blast Kills Two.—The Hillcrest collieries in the Crows' Nest Pass coal area of Alberta sustained serious damage from an explosion on the night of Sept. 19. Frank Lete, fireboss, and Fred Jones, pumpman were killed. The property loss will amount to many thousands of dollars, an accurate estimate of the damage being impossible owing to the entrance to the mine being blocked. The cause of the disaster has not been ascertained, but it is supposed to have been due to a spark from an electric wire igniting an accumulation of gas.

Change in Methods Boosts Output.—Corbin Coals, a Spokane company which is operating some exceedingly large seams of coal at Corbin, in the Crow's Nest Pass district of British Columbia, is changing its method of mining from underground work by the caving system to gloryholing. No. 4 mine has been closed, probably permanently. At No. 6 mine, known as the Big Showing, the overburden has been removed from the seam, which now is being worked by first breaking the coal by blasting and then loading it on cars by steam shovels. By this method a 50-ton car is loaded in five to six minutes. Powerful geared locomotives are used to haul the cars up and down the steep grades leading from the Big Showing to a washer, which was erected during last year. Between 50 and 60 out of a total of 125 men previously employed have been thrown out of work by the change, and the output of coal is being considerably increased. The company also is erecting some large coal bunkers, in which to store the washed coal in winter when it may be impossible to operate.



Yard Making Best Appearance, Inman Colliery, Wise County, Va.

F. C. Woodward got first prize for this yard in the annual contest of the Virginia Iron, Coal & Coke Co. in which prizes were given for the best looking yards and best looking vegetable gardens at Toms Creek, Inman and Imperial collieries.

Fire Cripples Beeson Mine.—Fire at 3 a.m. Sept. 23 crippled operations at the old Beeson mine of the Beeson Coal Co., northeast Uniontown. The fan house and boiler house were destroyed and the flames raged for some time in the airshaft. A small stream flowing through the works was dammed by workmen and the water pumped into the airshaft, the timbers in which were burning from top to bottom. After a hard fight the flames were extinguished. The fire is said to have started from a burning motor that drove the fan. William Johnson, manager of the company, said that repairs were being rushed and it was hoped to have the mine in operation again within a few days.

WEST VIRGINIA

Cliftonville Battle Recalled.—With the recent release of five Pennsylvania miners from the West Virginia penitentiary, Joe Tracz, serving an eight-year term, is the only remaining prisoner of the original 43 sentenced in Moundsville for taking part in the march over the state line into the little "scab" town of Cliftonville, in the West Virginia panhandle, on July 17, 1922,

of Logan, will make an outlay of \$2,160 for that purpose in its mining towns. Special attention is paid to the examination of school children.

Wet Branch to Expand.—The Wet Branch Mining Co., Inc., Pittsburgh, Pa., which recently disposed of a \$400,000 bond issue, will use a considerable portion of the proceeds for expansion at its properties and the installation of new machinery. The company's operations are at Dry Branch, Kanawha County.

Corona Fire Burns Ont.—After burning for more than six weeks, fire in the Corona mine No. 2 of the Corona Coal Co., at Hepzibah, has burned itself out and it is now believed that operation of the mine will be resumed in three weeks, B. R. Britt, manager and part owner, states. The blaze, which started July 30, destroyed the tippie and finally worked its way back into the mine. The mine was sealed and flooded. Immediate steps will be taken to rebuild the tippie.

J. G. Bradley, president of the Elk River Coal & Lumber Co., Dundon, and president of the West Virginia Coal Association; W. J. Jenks and B. W. Herrman, vice-presidents of the Nor-

Among the Coal Men

B. M. Jones, of Montgomery, Ala., was elected president of the Stith Coal Co., America, Ala., at a recent meeting of stockholders of the company. He succeeds **J. K. Dimmick**, who died a short time ago. **A. B. Aldridge**, Birmingham, Ala., is general manager of the company.

B. J. Matteson, president's industrial representative of the Colorado Fuel & Iron Co., has been appointed industrial relations executive with supervision of activities under the plan of joint representation, including education work, safety and personnel of the company, according to an announcement by **J. F. Welborn**, president of the company. **George M. Keller** was appointed assistant industrial executive. Mr. Matteson will continue to act as the president's industrial representative.

F. R. Wood, president of the Temple Fuel Co. and the Vicker Coal Co., of Trinidad, Colo., and also president of the Colorado & New Mexico Coal Operators' Association, has withdrawn his name as candidate for Governor of Colorado.

A. H. Pollins is now managing the Kentucky division of the United States Coal & Coke Co., comprising the Lynch mines. The new general superintendent comes from the Connellsville region of Pennsylvania and formerly was connected with the H. C. Frick Coke Co.

John Moseby, of Sullivan, Ind., has been made superintendent of Francisco Mine No. 2, at Francisco, Ind., to take the place of **W. E. Cox**, who resigned recently to go to Taylorville, Ill., to accept a similar position with the Peabody Coal Co. Both are well known to the industry.

F. T. Fitzharris, who for the last ten years has been chief engineer of the Eastern mining division of the Cosgrove-Meehan Coal Corporation, recently retired from that organization to take the presidency of the United Rock Asphalt Co., having plants in Kentucky and Alabama. His headquarters for the present will be in Louisville, Ky.

Cyrus H. Bowman, combustion engineer, formerly of Omaha, Neb., is a recent addition to the staff of the service department of the Bell & Boller Coal Co., Chicago.

G. E. Daugherty, of Pikeville, Ky., who for the last nine years has been state inspector of mines for the eastern Kentucky section, has resigned and gone to Welch, W. Va., to become safety director of the Keystone Pocahontas Coal Co., of Hemphill, W. Va. Mr. Daugherty was graduated in civil engineering from the Ohio Northern University in 1916.

Robert A. Colter, former president of the Cincinnati Coal Exchange and former vice-president of the Cincinnati Chamber of Commerce, was surprised by his friends of the trade on Sept. 9, when he was the guest of honor at a birthday party at the Chamber of Commerce.



Walter Barnum

Walter Barnum, president of the National Coal Association has accepted an invitation from President **Thomas S. Baker** to serve on the advisory board for the international conference on bituminous coal to be held at the Carnegie Institute of Technology, Pittsburgh, Pa., Nov. 15-19. This brings the total membership of the advisory board to nine. Other members include **Andrew W. Mellon**, **John Hays Hammond**, **Otto H. Kahn**, **Charles M. Schwab**, **Samuel Insull**, **E. M. Herr**, **Dr. Frank B. Jewett**, and **George E. Learnard**.

Obituary

Alfred H. Slayman, for thirty years years identified with the coal industry at Altoona, Pa., where he maintained an office in the Masonic Temple, died Sunday morning, Sept. 19. He was a native of Blair County, having been born near Duncansville, in 1854. He is survived by his wife and two daughters.

Association Activities

George B. Harrington, president of the Chicago, Wilmington & Franklin Coal Co., Chicago, has been appointed chairman of the research committee of the National Coal Association. With at least one additional appointment to be made, the remainder of the committee is as follows: **Warren S. Blauvelt**, president, **Vigo Mining Co.**, Terre Haute, Ind.; **H. Denman**, general manager, **Arkansas Mining Co.**, Clarksville, Ark.; **Thomas DeVenny**, superintendent, **Portsmouth By-Product Coke Co.**, Edgerton, W. Va.; **D. C. Kennedy**, vice-president, **American Eagle Colliery** and secretary, **Kanawha Coal Operators' Association**, Charleston, W. Va.; **M. J. McQuade**, president, **Ben Franklin Coal**

Co. of Pittsburgh, Pittsburgh, Pa.; **L. Rodman Page, Jr.**, treasurer, **Crozer Coal & Coke Co.**, Philadelphia, Pa.; **Ezra Van Horn**, general manager, **Clarkson Coal Mining Co.**, Cleveland, Ohio, and **J. P. Williams, Jr.**, general manager, **Melcroft Coal Co.**, Pittsburgh, Pa.

Traffic News

Say Freight Rates Discriminate Against Union Output

A protest against freight rates on coal fixed by the Interstate Commerce Commission, which it is charged discriminate against union-mined coal in favor of non-union coal was unanimously adopted after the concluding session of the forty-fourth annual session of the Illinois State Federation of Labor at Streator, Ill.

"Existing rates" the protest read, "discriminate against the union coal miner in Illinois and in favor of the mountain miners in adjoining states. Such rates, if continued, will result either in non-employment or in employment at a wage not in keeping with living conditions of American standard."

Officials were directed to appeal to Illinois Congressmen and candidates for Congress asking them "to use their offices to secure relief from such discriminatory rates."

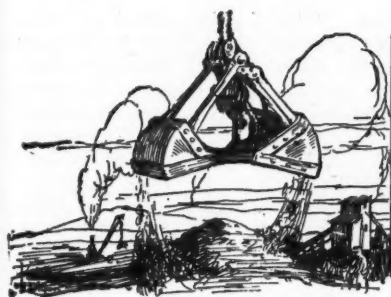
Northern Colorado Operators Seek Rate Cut

Northern Colorado coal operators claim that they and their products are objects of discrimination in violation of Sec. 3 of the U. S. Interstate Commerce Act because coal mined at the Pike View mine, east of Colorado Springs, is carrying a freight rate 15c. lower to Omaha and other eastern points than coal mined in northern Colorado. Their complaint was heard at Estes Park, Col. before Commissioner **Henry Hall** of the U. S. Interstate Commerce Commission and Examiner **Ames**. **Otto Rock**, member of the Colorado Public Utilities Commission, also took part in the hearing because the intrastate coal freight rate of the Rock Island railroad at points east of Limon to the state line also is involved.

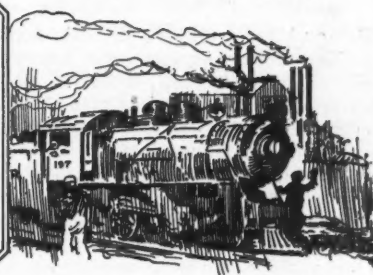
Complainants and defendant railroad companies, of which the Rock Island is the principal defendant, were given forty-five days in which to file their initial briefs.

It is pointed out that coal mined in northern Colorado can be shipped to Omaha and other eastern points by a haul that is no greater and in some instances less than the haul of Pike View coal mined near Colorado Springs. They are seeking reduction in their rate to the level from Pike View.

Oral argument before the Interstate Commerce Commission on the Grand Forks (N. D.) fine coal rate case has been set for Oct. 27 at Washington. The case is based upon an attempt by the Grand Forks Commercial Club to get a proportional rate on fine coal from the Duluth-Superior docks, to replace the present tariff.



Production And the Market



Variable Weather Accentuates Sectional Unevenness In Demand for Bituminous Coal

Temporary unevenness in demand, for which weather conditions largely were responsible, accentuated sectional variations in the bituminous coal markets of the country last week. Heavy rains in the Middle West have so interfered with transportation that a slowing up in ordering has been noticeable in Illinois and Indiana. Summer temperatures held back business in the Southwest and Intermountain states. Frost in the air, on the other hand, quickened buying in the Northwest. The cold wave that later hit the country came too late last week to be reflected in market developments in the Middle West.

In the East export buying was still the dominating influence in shaping the course of the markets. Spot tonnage of the higher grade coals is scarce and commands high prices. As a result medium and lower grade coals are receiving more attention. Quotations along the Atlantic seaboard are advancing; at New York and Philadelphia the sharpest increase has been on pool 11; at Baltimore pools 54 and 64 showed the largest advance. On-car prices at Boston went to \$7, but this was less than replacement cost, based on current Hampton Roads pier figures.

Fluctuations in Southern Fields

The effects of the export boom are most marked in West Virginia and eastern Kentucky. These two areas also enjoy the lion's share of the diminishing lake cargo business. For the time being, however, resistance to steady increases again is manifest in a greater discrimination in the selection of coals. This has caused some minor readjustments in spot prices on Kentucky slack and West Virginia high-volatile block. As an offset, all Kentucky block and West Virginia mine-run command higher prices.

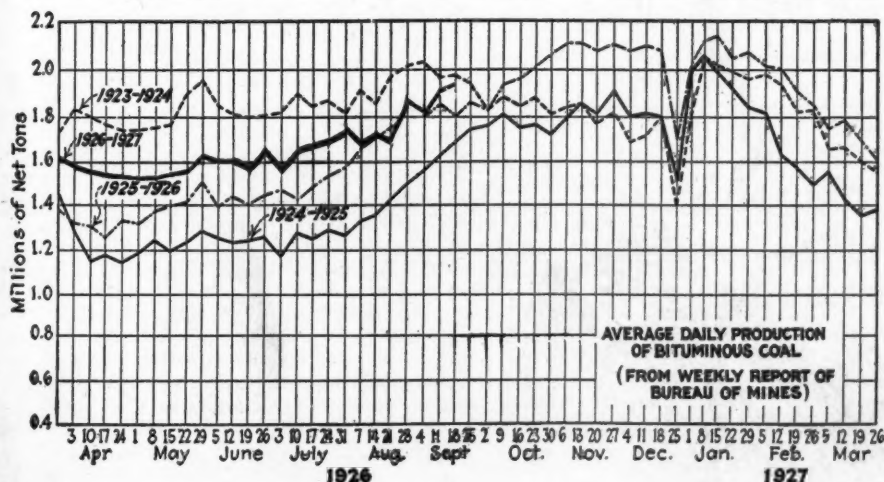
Taking the country as a whole, increases in open-market quotations exceed reductions. For the most part the latter are in Illinois and Indiana screenings. In these coals and in some intermediate sizes, reductions have been acknowledged officially and sharper concessions made on individual sales. *Coal Age* Index of spot bituminous prices for Sept. 27 was 183 and the corresponding weighted average price was \$2.22. This was an increase of two points and 3c. over Sept. 20 and the highest level reached this year.

High Production Rate Maintained

Production during the week ended Sept. 18 showed a rapid recovery from the holiday slump and reached 11,442,000 net tons. Output last week, if loadings the first few days may be accepted as a guide, will compare favorably. Barring 1920 and 1923, cumulative production to Sept. 18 was well ahead of other post-war years. The lag behind 1920 was only 748,000 tons; compared with 1923, however, it fell short 21,305,000 tons. Lake dumpings the week ended Sept. 26 dropped to 711,183 tons of cargo and 49,819 tons of vessel fuel, bringing the season's total to 21,802,897 tons, as against 19,427,713 tons last year.

First rumblings of a possible labor scarcity were heard last week from central Pennsylvania. Eastern Kentucky also was apprehensive.

The anthracite market continues to exhibit unmistakable indications of a healthy seasonal expansion. Production the week of Sept. 18 jumped to 2,003,000 net tons. Company prices on domestic sizes are firm. Independent quotations, except on egg and pea, show moderate advances. Stove and nut lead in demand. The steam market is improving, but buckwheat still goes into storage.



Estimates of Production

(Net Tons)

BITUMINOUS

	1925	1926
Sept. 4.....	10,827,000	11,015,000
Sept. 11 (a).....	9,983,000	10,257,000
Sept. 18 (b).....	10,880,000	11,442,000
Daily average.....	1,813,000	1,907,000
Cal. yr. to date.... (c)	346,988,000	386,222,000
Daily av. to date....	1,573,000	1,750,000

ANTHRACITE

Sept. 4.....	434,000	1,951,000
Sept. 11.....	5,000	1,690,000
Sept. 18.....	9,000	2,003,000
Cal. yr. to date... (c)	61,242,000	57,887,000

BEEHIVE COKE

Sept. 11 (a).....	167,000	182,000
Sept. 18 (b).....	171,000	197,000
Cal. yr. to date... (c)	6,871,000	8,662,000

(a) Revised since last report. (b) Subject to revision. (c) Adjusted to equalize number of days in the two years.

Illinois Demand Weakens

Demand for southern Illinois coal in the Chicago market weakened last week. Some concessions are reported on the smaller sizes of coal, but 6-in. lump is firmly held. Screenings still are soft despite the fact that heavy rains over Illinois and Indiana have curtailed production in those two states. Damage by cloudbursts have been so great that it may be several weeks before some of the operations are able to resume.

Unlike the situation in Western coals, orders for Eastern grades continue to pile up and even western Kentucky finds business strong enough to warrant an advance in prepared prices to offset the declines in quotations on screenings. Little free eastern Kentucky is seeking a market and shippers are coy about quoting firm prices for future delivery. High-volatile West Virginia coal also is scarce. Smokeless mine-run is steady at \$2.75, with little available. Contract deliveries of

lump are made at \$4.50 or less, so there is little demand in the Chicago market for prepared spot at \$5.50.

The heavy rains of the past fortnight were reflected in a slowing up in domestic orders in the southern Illinois field last week. Most operations there, however, still had a good tonnage of lump on their books and a comfortable margin of unfilled egg orders, but nut and steam sizes were backward. The weather disabilities of the stripping pits added little to the business of the shaft mines. "No bills" were common to all Illinois-Indiana districts. Few mines were working in the Jackson County-Duquoin sector.

Railroad Buying Helps Mt. Olive

Railroad buying continues heavy in the Mt. Olive district; domestic orders, too, show a substantial increase. The situation in the Standard district has not improved. Production is subnormal and prices low. General conditions in the St. Louis local market were un-

changed. Retail buying eased up prior to the week-end cold spell. Western Kentucky daily makes further gains west of the Mississippi River. Country steam trade has been relatively inactive.

The told wave of last week increased activity in the Louisville market and brought on further advances in prices on domestic sizes. Some eastern Kentucky block went to \$3.50, with most of the coal at \$3 and very little available at \$2.75. Western Kentucky is asking \$2.25 and up on 6-in. block. Mine-run is quiet. Steam demand keeps screenings well cleaned up in the local market, but reports of slaughter sales are heard from other quarters. Many of the mines in the eastern part of the state are so loaded up with orders that additional business is discouraged. Running time is increasing and there is a stronger demand for labor.

Lower temperatures have quickened the already substantial ordering in the Northwest. Both retail and industrial buyers are placing liberal orders with

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Sept. 28, 1925				Midwest	Market Quoted	Sept. 28, 1925			
		1925	1926	1926	1926†			1925	1926	1926	1926†
Smokeless lump.....	Columbus....	\$4.60	\$4.35	\$4.75	\$5.00@55.25	Franklin, Ill. lump.....	Chicago.....	\$3.25	\$3.25	\$3.25	\$3.25
Smokeless mine run.....	Columbus....	2.55	2.30	2.55	2.35@2.75	Franklin, Ill. mine run....	Chicago.....	2.35	2.40	2.40	2.35@2.50
Smokeless screenings.....	Columbus....	1.50	1.40	1.40	1.35@1.50	Franklin, Ill. screenings...	Chicago.....	1.60	1.55	1.50	1.40@1.65
Smokeless lump.....	Chicago.....	4.25	4.75	5.75	5.50@6.00	Central, Ill. lump.....	Chicago.....	2.85	2.60	2.60	2.50@2.75
Smokeless mine run.....	Chicago.....	2.25	2.60	2.60	2.75	Central, Ill. mine run....	Chicago.....	2.10	2.20	2.20	2.15@2.25
Smokeless lump.....	Cincinnati...	4.75	4.60	4.85	4.75@5.00	Central, Ill. screenings...	Chicago.....	1.55	1.40	1.40	1.30@1.50
Smokeless mine run.....	Cincinnati...	2.35	2.75	2.85	2.75@3.00	Ind. 4th Vein lump.....	Chicago.....	3.10	2.85	2.85	2.75@3.00
Smokeless screenings.....	Cincinnati...	1.85	1.85	1.85	1.75@2.00	Ind. 4th Vein mine run....	Chicago.....	2.35	2.25	2.25	2.15@2.35
Smokeless mine run.....	Boston.....	5.20	5.40	5.55	5.75@6.00	Ind. 4th Vein screenings...	Chicago.....	1.60	1.45	1.45	1.30@1.60
Clearfield mine run.....	Boston.....	1.90	2.10	2.35	2.15@2.75	Ind. 5th Vein lump.....	Chicago.....	2.35	2.40	2.40	2.25@2.60
Cambria mine run.....	Boston.....	2.10	2.25	2.50	2.25@3.00	Ind. 5th Vein mine run....	Chicago.....	1.95	2.00	2.00	1.90@2.10
Somersat mine run.....	Boston.....	2.00	1.95	1.95	2.00@2.15	Ind. 5th Vein screenings...	Chicago.....	1.20	1.30	1.25	1.00@1.15
Pool 1 (Navy Standard)...	New York....	2.85	2.55	2.55	2.50@2.75	Mt. Olive lump.....	St. Louis....	2.50	2.60	2.60	2.50@2.75
Pool 1 (Navy Standard)...	Philadelphia..	2.65	2.65	2.65	2.60@2.85	Mt. Olive mine run.....	St. Louis....	2.00	2.25	2.25	2.25
Pool 1 (Navy Standard)...	Baltimore....	2.30	2.20	2.20	2.20@2.30	Mt. Olive screenings....	St. Louis....	1.75	1.55	1.55	1.85
Pool 9 (Super. Low Vol.)...	New York....	2.20	2.05	2.05	2.00@2.25	Standard lump.....	St. Louis....	2.25	2.15	2.15	2.10@2.25
Pool 9 (Super. Low Vol.)...	Philadelphia..	1.95	2.10	2.10	2.10@2.30	Standard mine run.....	St. Louis....	1.80	1.80	1.80	1.75@1.85
Pool 9 (Super. Low Vol.)...	Baltimore....	2.05	1.95	1.95	1.90@2.00	Standard screenings....	St. Louis....	1.15	1.10	1.10	1.00@1.10
Pool 10 (H.Gr. Low Vol.)...	New York....	2.00	1.85	1.85	1.85@2.00	West Ky. block.....	Louisville...	1.90	1.90	1.90	1.85@2.25
Pool 10 (H.Gr. Low Vol.)...	Philadelphia..	1.85	1.85	1.85	1.80@2.00	West Ky. mine run.....	Louisville...	1.35	1.25	1.25	1.10@1.50
Pool 10 (H.Gr. Low Vol.)...	Baltimore....	1.90	1.80	1.80	1.85@1.90	West Ky. screenings....	Louisville...	.95	.85	.85	.75@.95
Pool 11 (Low Vol.).....	New York....	1.80	1.65	1.65	1.75@1.90	West Ky. block.....	Chicago.....	2.05	1.75	1.85	2.00@2.35
Pool 11 (Low Vol.).....	Philadelphia..	1.70	1.55	1.55	1.65@1.80	West Ky. mine run.....	Chicago.....	1.25	1.15	1.15	1.00@1.25
Pool 11 (Low Vol.).....	Baltimore....	1.70	1.75	1.75	1.75@1.85						

High-Volatile, Eastern		Sept. 28, 1925				South and Southwest		Sept. 28, 1925			
		1925	1926	1926	1926†			1925	1926	1926	1926†
Pool 54-64 (Gas and St.)...	New York....	1.55	1.45	1.45	1.40@1.55	Big Seam lump.....	Birmingham..	2.25	2.25	2.25	2.25@2.50
Pool 54-64 (Gas and St.)...	Philadelphia..	1.60	1.55	1.60	1.60@1.75	Big Seam mine run.....	Birmingham..	1.75	1.85	1.85	1.75@2.00
Pool 54-64 (Gas and St.)...	Baltimore....	1.65	1.70	1.70	1.80@1.95	Big Seam (washed).....	Birmingham..	1.85	2.00	2.00	1.85@2.25
Pittsburgh so'd gas.....	Pittsburgh...	2.50	2.40	2.40	2.35@2.50	S. E. Ky. block.....	Chicago.....	3.00	2.60	2.85	2.75@3.00
Pittsburgh gas mine run...	Pittsburgh...	2.15	2.10	2.10	2.00@2.20	S. E. Ky. mine run.....	Chicago.....	1.95	1.75	1.75	1.60@1.90
Pittsburgh mine run (St.)	Pittsburgh...	2.05	2.00	2.00	1.90@2.10	S. E. Ky. block.....	Louisville...	2.85	2.75	2.75	2.75@3.25
Pittsburgh slack (Gas)...	Pittsburgh...	1.55	1.35	1.40	1.35@1.45	S. E. Ky. mine run.....	Louisville...	1.60	1.65	1.65	1.50@1.85
Kanawha lump.....	Columbus....	2.60	2.50	2.75	2.50@3.00	S. E. Ky. screenings....	Louisville...	1.25	1.15	1.15	1.10@1.25
Kanawha mine run.....	Columbus....	1.70	1.70	1.70	1.65@2.00	S. E. Ky. block.....	Cincinnati...	2.85	2.85	2.85	2.75@3.00
Kanawha screenings....	Columbus....	1.30	1.15	1.15	1.10@1.25	S. E. Ky. mine run.....	Cincinnati...	1.60	1.75	1.75	1.60@2.00
W. Va. lump.....	Cincinnati...	2.60	2.75	2.75	2.50@2.75	S. E. Ky. screenings....	Cincinnati...	1.15	1.25	1.30	1.10@1.35
W. Va. gas mine run.....	Cincinnati...	1.60	1.80	1.80	1.75@2.00	Kansas lump.....	Kansas City..	4.35	4.60	4.60	4.50@4.75
W. Va. steam mine run...	Cincinnati...	1.55	1.70	1.70	1.60@1.75	Kansas mine run.....	Kansas City..	3.00	3.00	3.00	3.00
W. Va. screenings....	Cincinnati...	1.15	1.25	1.30	1.10@1.25	Kansas screenings....	Kansas City..	2.40	2.35	2.35	2.35
Hooking lump.....	Columbus....	2.70	2.40	2.40	2.35@2.50						
Hooking mine run.....	Columbus....	1.65	1.55	1.55	1.40@1.75						
Hooking screenings....	Columbus....	1.30	1.20	1.20	1.15@1.25						
Pitta. No. 8 lump.....	Cleveland...	2.35	2.15	2.15	1.90@2.50						
Pitta. No. 8 mine run...	Cleveland...	1.85	1.70	1.75	1.70@1.80						
Pitta. No. 8 screenings...	Cleveland...	1.40	1.20	1.25	1.20@1.30						

* Gross tons, f.o.b. vessel, Hampton Roads

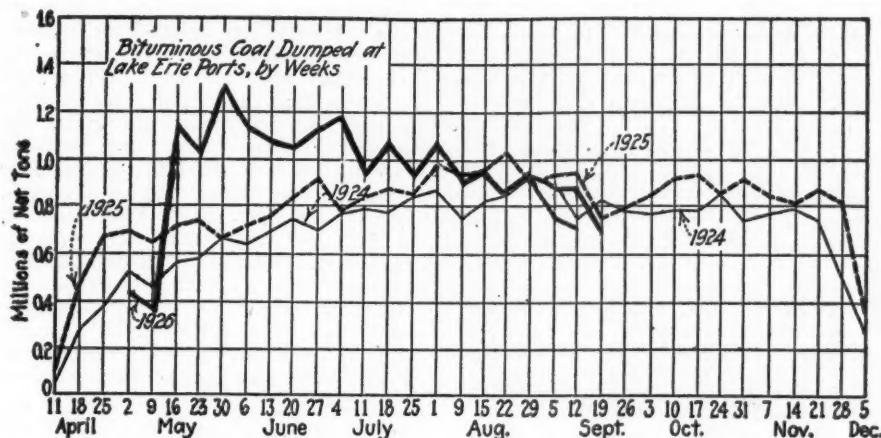
† Advances over previous week shown in heavy type, declines in italics

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Sept. 28, 1925		Sept. 20, 1926		Sept. 27, 1926†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34		\$8.20@8.95		\$8.50@9.25		\$8.50@9.25
Broken.....	Philadelphia..	2.39				8.50@9.15		8.50@9.15
Egg.....	New York....	2.34	\$14.00@15.00	8.65@8.90	8.80@9.20	8.75@9.25	9.00@9.25	8.75@9.25
Egg.....	Philadelphia..	2.39			9.00@9.75	9.00@9.15	9.15@9.25	9.00@9.15
Egg.....	Chicago.....	5.06	8.17@8.60	8.03@8.28	8.14	8.13	8.14	8.13
Stove.....	New York....	2.34	14.00@15.00	9.15@9.40	9.25@9.75	9.25@9.50	9.50@9.85	9.25@9.50
Stove.....	Philadelphia..	2.39			9.15@10.20	9.35@9.50	9.60@10.20	9.35@9.50
Stove.....	Chicago.....	5.06	10.00@11.00	8.48@8.80	8.59	8.33@8.58	8.59	8.33@8.58
Chestnut.....	New York....	2.34	14.00@15.00	8.65@8.95	9.00@9.25	8.75@9.15	9.15@9.45	8.75@9.15
Chestnut.....	Philadelphia..	2.39			8.50@9.75	9.00@9.15	9.00@9.75	9.00@9.15
Chestnut.....	Chicago.....	5.06	10.00@11.00	8.28@8.50	8.39	8.33@8.53	8.39	8.33@8.53
Pea.....	New York....	2.22	6.50@7.00	5.00@6.00	6.25@6.75	6.00@6.50	6.00@6.75	6.00@6.50
Pea.....	Philadelphia..	2.14		5.00@6.00	6.00@6.75	6.00@6.50	6.30@6.75	6.00@6.50
Pea.....	Chicago.....	4.79	5.25@5.75	5.05@5.36	6.03	6.10	6.03	6.10
Buckwheat No. 1.....	New York....	2.22	2.60@3.00	2.50	2.10@2.50	3.00@3.50	2.15@2.50	2.50@3.50
Buckwheat No. 1.....	Philadelphia..	2.14		2.50	1.85@2.50	2.25@2.75	2.00@2.50	2.25@2.75
Rice.....	New York....	2.22		2.25	1.60@2.00	2.00@2.25	1.60@2.00	2.00@2.25
Rice.....	Philadelphia..	2.14		2.25	1.30@2.00	1.75@2.25	1.65@2.00	1.75@2.25
Barley.....	New York....	2.22		1.50	1.25@2.25	1.75@2.25	1.25@1.50	1.60@2.25
Barley.....	Philadelphia..	2.14		1.50	1.25@1.75	1.50@1.75	1.50@1.75	1.50@1.75
Birdeye.....	New York....	2.22		1.60	1.25@1.60	2.00	1.40@1.60	2.00

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type; declines in italics.

‡ Quotations withdrawn because of strike which started Sept. 1, 1925.



the docks at the Head of the Lakes. Most of the Superior-Duluth plants have been working close to capacity and many of them are booked up to the middle of October. Deliveries on public-utility and general steam contracts are heavy. Railroads, too, are taking advantage of favorable transportation conditions to move their coal off the docks.

Dock Quotations Firm

Quotations on bituminous coals are held at the higher levels announced on Sept. 1. Notwithstanding the activity in anthracite, bookings of Pocahontas are heavier than they were at this time a year ago. Prepared sizes are firm at \$7.25@7.50; mine-run at \$5.25 and slack at \$4.25. Anthracite prices also are steady at the bases fixed at the beginning of the new coal year. Demand for domestic coke has picked up and some interest is shown in briquets.

Suggestions of frost in the air have speeded up buying for domestic consumption in the Twin Cities. Steam users also are showing more interest in the market. Price concessions on industrial orders are very infrequent. Dock men at Milwaukee report a growing demand for all classes of coal. Anthracite in particular is coming to the front, but without dimming the popularity of smokeless. Upon the latter wholesalers decline to accept all-rail orders for early shipment.

Mild weather the first half of September slowed up demand for domestic sizes in the Southwest. Business, nevertheless, was well ahead of the corresponding period in 1925. Arkansas screenings are finding a ready outlet at firm prices, but accumulations of fine coal in the Kansas field threaten to become bothersome. The lull in buying has enabled many Kansas operators to catch up on orders and they are now actively soliciting business.

Dull in Colorado and Utah

Dullness brought about by weather conditions also was the complaint in the Colorado field early last week. Retailers in Nebraska and Kansas were reluctant to build up yard stocks for the winter despite intensive canvassing by the producers. Steam demand, however, has been well sustained. Of the domestic coals, bituminous lump and nut are the most backward. The Colorado anthracites are in a stronger position. Utah, too, reported a slow domestic market, with a surplus of unbilled intermediate sizes. Some apprehension

is voiced over the future supply of slack unless lump buying improves.

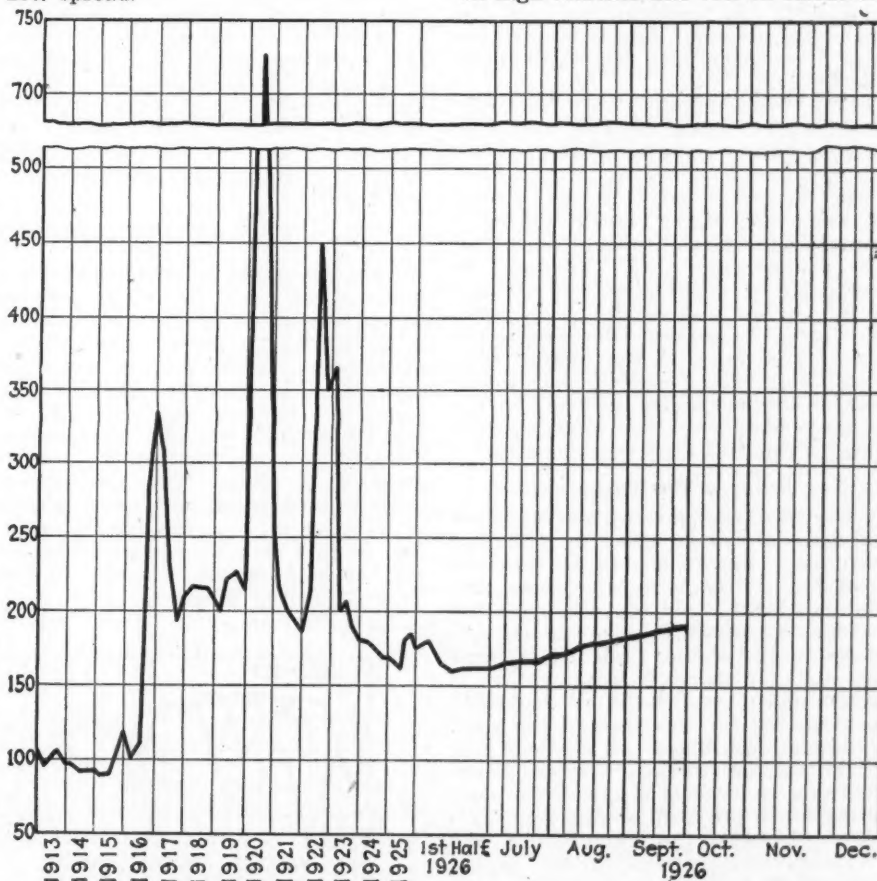
The driving force back of the Cincinnati market at the present time is the insistence of lake and tidewater buyers who placed orders some time ago at lower prices that deliveries be rushed. Free coal is limited and probably less than 25 per cent of the present movement commands the current higher prices. Smokeless shippers are sold up to mid-October. A circular price of \$5 on lump and \$2.75 on mine-run is forecast. The \$3 price on mine-run and \$2 on slack meet with increased resistance and late quotations show a return to the 25c. spread.

There has been a slight readjustment in high-volatile prices. With the first rush of September buying over, purchasers again display more discrimination in selection. As a result, the general market on West Virginia block has narrowed to \$2.50@2.75, with specialty brands up to \$3.25. In Kentucky the more select grades command up to \$4 for block and \$2.25@3 for egg. Demand for gas and byproduct coals is stronger and mine-run suitable for those purposes is bringing \$1.75@2. Slack is easier.

Cincinnati Movement Decreases

Coal movement through the Cincinnati gateway declined 1,239 cars last week. The total loads interchanged was 13,672. The heaviest loss, 982 cars, was on the Chesapeake & Ohio. Louisville & Nashville shipments declined 398 cars. Norfolk & Western movement was up 125 cars. Included in the totals were 2,736 cars en route to the lakes. The movement of empty open-top equipment to the mines showed a substantial increase last week. The campaign to foster prompt loading and unloading is unabated.

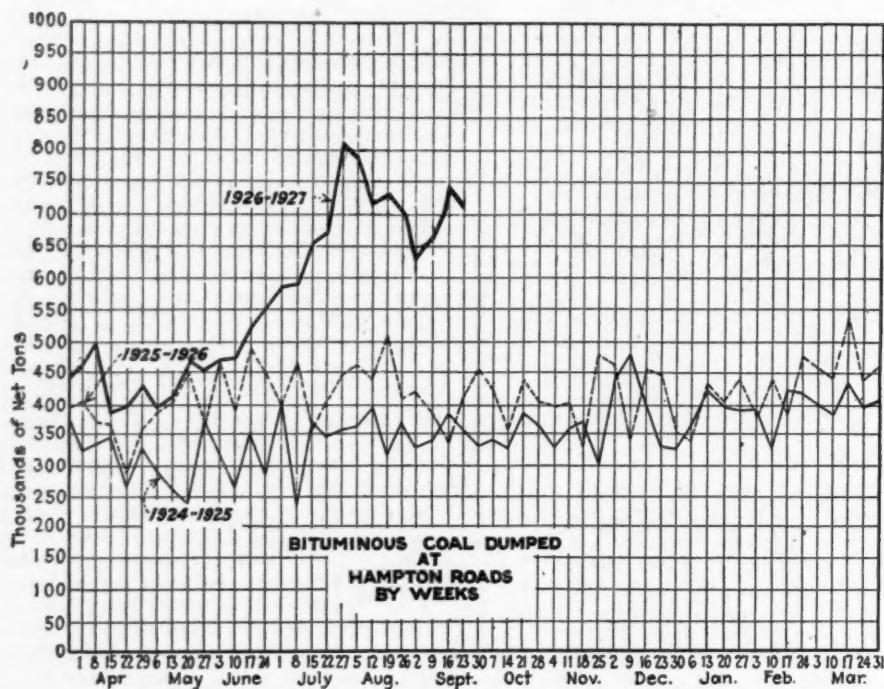
Premium demands on spot cars of domestic coal are forcing up retail prices in the Columbus market. The turn of the month probably will see another 50c. added to the retail price on high-volatiles and 75c. on smokeless.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1926	1925	1924
Sept. 27	183	181	176
Sept. 20	176	171	170
Sept. 13	171	176	170
Sept. 4	176	171	170
Sept. 28	171	176	170
Sept. 29	170	176	170
Weighted average price.....	\$2.22	\$2.19	\$2.13
	\$2.22	\$2.13	\$2.06

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.



Steam trade, too, is showing increased activity, but the movement lacks the urge displayed in domestic buying. Although West Virginia and Kentucky coals have had first call, particularly in the domestic market, Ohio also is profiting. More mines are being reopened in the southern part of the state, where output now is 25 to 28 per cent of capacity, with further improvement in sight.

Both sentimentally and from the standpoint of actual demand, the Cleveland market is in better shape. Prices on spot coal from the No. 8 field, however, do not respond to the upward movement; a nickel gain in the minimum on three-quarter lump measured the change last week. Possibly the reopening of more mines to take care of the increase in tonnage is responsible. Production in eastern Ohio during the week ended Sept. 11 was 264,000 tons, or 38 per cent of capacity. This output, 14,000 tons under the total for the corresponding week last year, was the largest reported in several months.

No Change in Pittsburgh District

The Pittsburgh district market shows no material change either in volume or in prices. Export demand for gas coal continues fairly large and some producers are well sold up. Gas mine-run brings \$2.10@2.20 for export and down to \$2 for line trade. Movement of coal for domestic consumption is active and the volume is all that could be expected for this time of the year. Industrial consumers as a whole buy little coal for storage. Western Pennsylvania as a whole is said to be operating at 65 per cent of capacity. This figure includes the Connellsville and Westmoreland districts as well as the Pittsburgh field proper.

Central Pennsylvania output is forging ahead of August shipments. The minimum on pool 1 has advanced 10c., but pools 9, 10 and 18 are slightly weaker. Pool 1 is quoted at \$2.70@2.90; pool 71, \$2.40@2.55; pool 9, \$2.25@2.35; pool 10, \$2.10@2.15; pool 11, \$1.75@1.80 and pool 18, \$1.65@1.70. More central Pennsylvania coal

is finding an export outlet and competition with West Virginia is less severe in the home markets.

Excellent transportation service acts as a constant check upon prices in the Buffalo market. Each week operators send out notices of increases, but buyers merely sit back, confident of their ability to pick up tonnage at the old figures. The exception is in the low-volatiles from West Virginia, but the Buffalo market passes them by for lower-priced offerings from other fields. Aside from a drop of 25c. on Allegheny Valley mine-run, high-volatile quotations are unchanged.

Navy Standard \$7 on Cars

Toward the end of last week, Navy Standard coal sold for \$7 on cars at Boston and at \$6.75@7 at Providence. Little tonnage actually moved at the \$7 figure, however, because few shippers cared to speculate in spot tonnage. At Hampton Roads pool 1 coal sold up to \$5.75 and one sale for New England delivery was reported at \$6 gross, f.o.b. piers. With the upward trend to pier prices and the hardening in water rates, however, the \$7 quotation on cars at Boston is less than the cost of replacement, so that further advances appear imminent.

All-rail steam coals from central

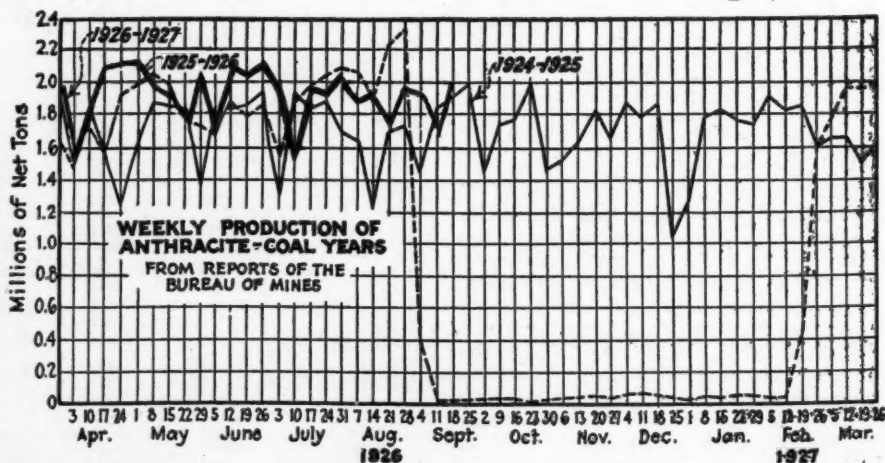
Pennsylvania have been in a better demand. The bulk of the new sales made last week probably brought \$2.25 net, f.o.b. mines, although some orders were booked at \$2.40 and \$2.50. Little quality coal can be picked up under \$2. Some high-volatile has been sold at \$1.55 but most of the coal of this class is held at \$1.90@2. West Virginia byproduct coke is up to \$10.50, ovens, for domestic and \$12.25 for foundry. Crushed Connellsville is quoted at \$5@5.25 and foundry coke, \$4@4.50.

Heavier export buying of Pennsylvania coals is diverting more tonnage from the New York bituminous market. As a result pool prices have jumped 10 to 25c. In some cases the larger increase has been on the lower grade coals which were selling at or below cost. Bunker demands in New York harbor absorb most of the offerings of the better grades. The local tidewater market is firm and there is very little free coal at the piers. Complaint is made by producers that the labor supply at the mines is short and that the men will not work full time.

Strike Spurs Philadelphia Buyers

Spurred on by the prolonged British strike, buyers are entering the Philadelphia market in greater numbers. A few conservatives, however, cling to a hand-to-mouth system in the hope that there will be a reaction later. Pennsylvania low-volatiles are stronger. Operators seeking to reopen mines complain that it is difficult to recruit working forces. New England is buying more coal in the Philadelphia market. Bunker business, too, is increasing and export clearances and inquiries for future deliveries also play their part in the present movement. Much of the coal now being exported from this port is for destinations other than Great Britain.

There has been some stiffening in prices for local and inland delivery at Baltimore, but the center of attraction is still the export trade. During the first three weeks of September export loadings exceeded 525,000 gross tons. In all probability September totals will be 150,000 tons greater than in August, when all previous records were broken. This business has been a boon to northern West Virginia. The Baltimore & Ohio R.R. reports a daily average of 1,000 loads from the Fairmont district. In the home market, purchasing agents still jockey for position, but the free supply of high grade coal is growing smaller.



Car Loadings and Supply

	Cars Loaded—	
	All Cars	Coal Cars
Week ended Sept. 11, 1926....	1,031,081	182,233
Week ended Sept. 4, 1926....	1,151,346	197,877
Week ended Sept. 12, 1925....	975,434	157,357
Week ended Sept. 5, 1925....	1,102,946	178,218

	Surplus Cars—		Car Shortages—	
	All Cars	Coal Cars	All Cars	Coal Cars
Sept. 8, 1926	141,096	33,039		
Aug. 31, 1926	161,478	38,967		
Sept. 7, 1925	146,998	43,289		

Demand is steadily improving and the trend is decidedly upward in the Birmingham district. The market as a whole, however, is not active. Some grades of prepared coal are scarce. Spot inquiry and contract bookings take care of the output of standard steam grades. Some producers are reluctant to accept additional contracts at present prices. In the domestic field a slight improvement in demand for the white-ash coals from Walker County is the only change. The coke market is strong, although spot domestic sizes can be bought at prices 25c. under those quoted last week, making the range \$4.75@5 on egg, \$4.25@4.50 on stove and \$3.75@4 on nut.

New York Anthracite Active

Although many consumers are lag-gard in ordering, business placed by the retail dealers is large enough to take care of all the domestic sizes rolling to the New York anthracite market. The ease with which company coal may be obtained by retail distributors, however, is holding independent prices in check. Higher premiums are demanded, particularly on line deliveries, but there is nothing sensational in the increases. Stove and nut maintain their leadership; in the city the former is in greatest demand, in the line trade it is nut which commands the center of the stage. Steam sizes on the whole are stronger.

Philadelphia, too, reports a growing demand for domestic anthracite, with a rapid acceleration in early prospect. Company stove is less free and nut soon threatens to be as tight. Offerings of pea also are readily absorbed. More sales pressure is required to move premium coal, but advances have been made on all sizes except egg, which has weakened. All producers have a sur-

plus of No. 1 buckwheat. There is a stronger demand for company rice, but independent offers are made at concessions. Barley is well sold up by the larger shippers.

More activity in anthracite is in evidence at Baltimore, but prices are unchanged. Boston retail demand shows further expansion and distributors are more anxious to increase their orders for company coal. Aside from stove, for which some retailers would pay \$10 in straight shipments, there is no snap to the call for independent tonnage. Locally, anthracite demand is behind other seasons at Buffalo, although there has been a steady improvement in recent weeks. Lake shipments continue to decline. During the week ended Sept. 23 the total dumped at Buffalo was 26,600 net tons, of which 14,400 tons cleared for Duluth and Superior, 7,200 tons for Milwaukee, 3,000 tons for Fort William and 2,000 tons for the Soo.

Coke Market Stronger

Limited offerings, rather than increased demand, forced spot prices on Connellsville foundry coke to \$3.50 last week. Ovens still talk \$3.50 on fourth-quarter contracts, but there has been little additional inquiry. With few exceptions merchant ovens are covered for the rest of the year. Spot foundry coke is stronger in tone, but the general level of \$4@4.50 still holds. Demand for crushed coke for domestic consumption is broadening.

Production during the week ended Sept. 18 declined 2,060 tons, according to the Connellsville *Courier*. The total output of coke from the Connellsville and Lower Connellsville region was 136,210 tons. Furnace-oven output was 63,700 tons, or 2,800 tons less than during the week ended Sept. 11. Merchant-oven output was 72,510 tons, an increase of 740 tons over the preceding week.

Connellsville Perks Up.—Indications of a pick-up in the coal and coke trade in the Connellsville region are seen in the resumption of operations at the McClemon Coal Co. mine near Uniontown, after more than two years' idleness. The Oliver & Snyder Steel Co. has fired additional furnaces and the H. C. Frick Coke Co. is increasing its operating schedule.

Mechanization of Ruhr Mines Advances Rapidly

Mechanization of coal mines in the Ruhr district of Germany has made rapid strides of late. Official figures, just collected, show the following machines at work in the district:

	At End of 1913	At End of 1925
Hammer drills.....	10,141	31,516
Revolving hammer drill machines.....	32	2,260
One-man hammer drills.....	189	35,666
Lighter ones (up to about 15 lb.).....	29	21,249
Heavier ones (over 15 lb.).....	160	14,417
Coal-cutting machines.....		316
Mining machines.....	13	522
Medium sized (up to about 4,000 lb.).....		82
Heavier ones (over 4,000 lb.).....	13	440
Post cutters.....	231	748
Shaking-conveyor motors.....	1,672	6,195
Length of conveyors, kilometers.....	104,842	361,954

The increase for most of the machines, the figures show, has been over 50 per cent. At the present time only 49.6 per cent of the output of the Ruhr mines is produced by hand work or shooting, while in 1913 only 5 per cent was produced by mechanical methods.

Vacancies in Federal Service.—The U. S. Civil Service Commission announces a competitive examination for junior mining engineer, applications to be on file at Washington, D. C., not later than Oct. 23. The date for assembling of competitors will be stated on admission cards sent applicants about ten days after the close of receipt of applications. The examination is to fill vacancies in various branches of the government service throughout the United States. The entrance salary in the District of Columbia is \$1,860 a year, and advancement in pay without material change in duties may be made to higher rates within the pay range for the grade, up to a maximum of \$2,400 a year. Promotion to higher grades may be made in accordance with the civil service rules as vacancies occur. Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examiners at the post office or custom house in any city.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of August

(In Net Tons)

Ports	Railroads	1926			1925			1924		
		Cargo	Fuel	Total	Cargo	Fuel	Total	Cargo	Fuel	Total
Toledo.....	Hocking Valley.....	5,002,693	145,855	5,148,548	5,213,981	150,063	5,364,044	4,056,708	119,464	4,176,172
	Big Four.....	1,233,937	8,046	1,241,983	967,622	5,787	973,409	1,375	46	1,421
	N. Y. C.-Ohio Central Lines..	1,322,586	68,874	1,391,460	596,616	44,782	641,398	38,159	1,412	39,571
Sandusky.....	Baltimore & Ohio.....	1,638,929	47,076	1,686,005	2,016,591	61,807	2,078,398	1,110,205	34,710	1,144,915
	Pennsylvania.....	4,300,831	125,828	4,426,659	3,390,500	101,427	3,491,927	2,051,571	63,376	2,114,947
	Wheeling & Lake Erie.....	325,355	20,784	346,139	435,947	19,976	455,923	463,986	23,395	487,381
Huron.....	Baltimore & Ohio.....	1,139,550	83,258	1,222,808	612,703	85,722	698,425	1,116,887	88,422	1,205,309
	Pennsylvania.....	260,746	96,835	357,581	197,721	107,295	305,016	941,049	109,060	1,050,109
	Erie.....				18,138	1,252	19,390	205,809	7,454	213,263
Fairport.....	Baltimore & Ohio.....	407,708	54,293	462,001	409,545	60,166	469,711	332,410	58,593	391,003
	New York Central.....	149,046	56,875	205,921	233,408	58,425	291,833	615,871	71,283	687,154
	Pennsylvania.....	598,586	44,666	643,252	452,075	54,966	507,041	700,496	51,796	752,292
Ashtabula.....	Beaumont & Lake Erie.....	1,130,358	150,225	1,280,583	751,034	143,791	894,825	1,034,305	137,462	1,171,767
	Pennsylvania.....	246,188	50,564	296,752	143,291	35,747	179,038	374,051	50,843	424,894
Conneaut.....										
Erie.....										
Total.....		17,756,513	953,179	18,709,692	15,439,172	931,206	16,370,378	13,042,882	817,316	13,860,190
Storage Loading.....		*60,142	774	60,916	*33,017	1,048	34,065	*182,060	4,940	187,000

* Coal loaded into vessels in December of previous year, after close of navigation and forwarded from Lake Erie ports during year indicated. Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, manager.

Foreign Market And Export News

Shipments to Great Britain Swell August Exports

Heavy shipments to Great Britain and the Irish Free State again swelled the bituminous exports from the United States in August. The total export movement for the month was 3,547,791 gross tons, an increase of 307,597 tons over the July figures. Shipments to Great Britain and the Irish Free State constituted over 45 per cent of the total movement and Canada took over 32 per cent, leaving 799,435 tons to be distributed to the other 48 countries and regions for which coal was cleared during the month.

Anthracite exports totaled 395,078 tons, as against 389,559 tons in July. Of this quantity, 385,105 tons went to Canada. Coke exports declined from 81,384 tons in July to 75,286 tons in August.

The distribution of the August business was as follows:

To	Anthracite Gr. Tons	Bituminous Gr. Tons	Coke Gr. Tons
Denmark and Faroe Islands.....	1,602	.....	.....
France.....	18,085	.....	.....
Irish Free State.....	92,420	.....	.....
Gibraltar.....	5,527	.....	.....
Italy.....	146,422	.....	.....
Netherlands.....	.....	.....	1
Norway.....	7,688	.....	.....
Portugal.....	10,414	.....	.....
United Kingdom.....	30	1,510,761	1
Canada.....	385,105	1,145,175	73,936
British Honduras.....	418	.....	.....
Guatemala.....	86	34	5
Honduras.....	.....	10	.....
Nicaragua.....	300	.....	2
Panama.....	.....	48,700	.....
Salvador.....	6	.....	.....
Mexico.....	182	7,734	158
Newfoundland and Labrador.....	2,127	9,288	.....
Jamaica.....	.....	28,265	.....
Other British West Indies.....	.....	6,533	2
Cuba.....	5,780	23,815	893
Dominican Republic.....	.....	1,555	37
Dutch West Indies.....	.....	3,500	.....
Virgin Islands of United States.....	.....	4,713	2
Argentina.....	189,080	.....	.....
Brazil.....	90,033	.....	148
Colombia.....	9	.....	22
Ecuador.....	.....	15	.....
British Guiana.....	508	2,425	.....
Uruguay.....	124	18,034	.....
Venezuela.....	.....	1,530	49
Egypt.....	.....	41,295	.....
Algeria and Tunis.....	.....	11,354	.....
Canary Islands.....	.....	41,279	.....
Costa Rica.....	25	.....	.....
Miquelon and St. Pierre Islands.....	347	1,914	.....
Japan (Including Chosen).....	40	.....	.....
Greece.....	.....	4,905	.....
Malta, Gogo and Cyprus Islands.....	.....	1,541	.....
Spain.....	.....	4,861	.....
Turkey in Europe.....	.....	6,473	.....
Bermuda.....	.....	1,982	.....
Barbados.....	.....	4,079	5
Trinidad and Tobago.....	.....	9,412	.....
Peru.....	.....	35	.....
Philippine Islands.....	.....	9,348	.....
British West Africa.....	.....	8,571	.....
Other French Africa.....	.....	6,633	.....
Morocco.....	.....	3,636	.....
Other Portuguese Africa.....	.....	17,106	.....
Paraguay.....	.....	.....	25
Total.....	395,078	3,547,791	75,286

Bunker coal supplied to vessels engaged in foreign trade totaled 708,596 gross tons, as against 444,059 tons in August, 1925.

Near-Stagnation Grips Trading In French Coal Markets

Paris, France, Sept. 9.—Moribundity has seized the French coal markets. For this the unending British strike is chiefly responsible. Great Britain, normally a major source of supply, is now buying coal from the French pits. Home demand for domestic grades is easier. Industrial consumers, however, continue to place orders, but without feverish insistence.

The crop movement is not yet under way so that empty canal barges and railway trucks are obtained with little difficulty by the collieries. The labor supply is increasing. Many of the men who have been spending the summer in other occupations above ground are drifting back to their old places in the mines.

There have been some recent offers of sized Belgian coals. German coals also are reaching the market through indirect channels. More Russian anthracite has been received at Rouen, but only two barge loads have been allotted to Paris. The rest has been distributed along the coast from Le Tréport to Caen to be tried out before new orders are placed with the Donetz basin.

During July the French mines produced 4,297,019 metric tons of coke and 84,347 tons of lignite, as compared with 4,344,982 and 84,999 tons, respectively, in June. July coke output was 318,889 tons; patent fuel, 372,756 tons. In June the figures were 306,778 and 371,025 tons, respectively.

Export Clearances, Week Ended Sept. 23

FROM HAMPTON ROADS

For United Kingdom:	Tons
J.-S. Str. Ixgled.....	6,896
Nor. Msp. Beljeanne.....	9,800
Du. Str. Zaandijk.....	4,995
Br. Str. Staggpool.....	6,604
Ital. Str. Gerarchia.....	7,644
Span. Str. Abodi Mendi.....	7,508
Ger. Str. Signal.....	4,568
Ital. Str. Tirreno.....	7,194
Span. Str. Salazar.....	4,562
Br. Str. Amblesstone.....	7,476
Br. Str. Geddington Court.....	6,794
Span. Str. Gorbear Mendi.....	5,750
Ger. Str. Zannis L. Cambanis.....	6,917
Br. Str. Rathlin Head.....	8,490
Br. Str. Kafirstan.....	7,859
Br. Str. Yorkminster.....	5,345
Ital. Str. Serenitas.....	7,326
Grk. Str. Panghis.....	7,416
Br. Str. Nortonian.....	8,428
For England:	
Dan. Str. Benmachdul, for Avonmouth.....	7,660
Dan. Str. Emilie Maersk, for Dover.....	3,388
Br. Str. Roelo, for London.....	6,070
Br. Str. Pillion, for Manchester.....	4,805
For Cuba:	
Br. Str. Emperor Frederickton, for Havana.....	2,616
For Egypt:	
Br. Str. Vulcan City, for Port Said.....	7,111
Ital. Str. Sic Voc Non Vobis, for Port Said.....	7,632
For British Indies:	
Nor. Str. Fram, for Port of Spain.....	4,062
For Argentina:	
Amer. Str. West Keene, for Buenos Aires.....	5,718
Br. Str. North Britain, for Rosario.....	4,916
For French Morocco:	
Ital. Str. Giovanna Florio, for Oran.....	7,280

For Brazil:	
Br. Str. Ethel Radcliffe, for Rio de Janeiro.....	7,907
Br. Str. Mistley Hall, for Rio de Janeiro.....	6,136
Br. Str. Tenburg, for Rio Grande do Sul.....	5,832
Br. Str. Peterston, for Santos.....	6,184
For Spain:	
Br. Str. Ronda, for Gibraltar.....	6,343
For Peru:	
Peru. Str. Amazonas, for Callao.....	2,005
For Danish West Indies:	
Nor. Str. Jessie, for Curacao.....	4,131
For New Brunswick:	
Nor. Str. Martensen, for St. John.....	2,757
For Portugal:	
Br. Str. Chiswick, for Lisbon.....	4,622
For Wales:	
Ital. Str. Leriel, for Swansea.....	5,655
For Ecuador:	
Peru. Msp. Husick.....	2,376

FROM BALTIMORE

For England:	
Ital. Str. Carla.....	7,188
Br. Str. Merioneth.....	7,529
Br. Str. Zimerodok.....	5,441
Br. Str. Grelisle.....	7,023
Br. Str. Hannington Court.....	7,652
Br. Str. Oaklands Grange.....	7,218
Br. Str. Trelissick.....	6,887
Br. Str. Yorkmoor.....	6,252
Ital. Str. Monte Maggieri.....	5,017
Br. Str. Homer City.....	6,765
Fr. Str. Lt. Octave.....	5,475
Br. Str. Lady Kathleen.....	5,991
Br. Str. Fernlea.....	7,037
Br. Str. Glenardle.....	6,184
Span. Str. San Salvador.....	4,882
Br. Str. Adra.....	6,795
For Ireland:	
Br. Str. Charterhulme, for Dublin.....	5,517
Br. Str. Lord Downshire, for Cork or Dublin.....	1,771
Br. Str. General Lukin, for Dublin.....	4,128
For Italy:	
Ital. Str. Roana, for Genoa.....	9,164
Ital. Str. Kallorua, for Savona.....	9,529
Ital. Str. Ansaldo Ottovo, for Genoa.....	6,495
For Wales:	
Br. Str. Tynebridge, for Swansea.....	6,537
Ital. Str. Andalusia, for Swansea.....	6,398
For Argentina:	
Br. Str. Wyncote, for La Plata.....	5,577
Br. Str. Pentoway, for La Plata.....	5,142
For Chile:	
Am. Str. Denel, for San Antonio, (Coke).....	2,536
FROM PHILADELPHIA	
For United Kingdom:	
Br. Strs. Paris City, Mackworth and Camerata.....	.....
For Argentina:	
Bel. Str. Gouverneur de Lantsheere, for Buenos Aires.....	.....
For Canary Islands:	
Br. Str. Roseden, or Las Palmas.....	.....
Am. Sch. J. R. Gordon, for Las Palmas.....	.....
For Austria:	
Ital. Str. Lucia C., for Spalato.....	.....
For Algeria:	
Ital. Str. San Terenzo, for Oran.....	.....

Hampton Roads Coal Dumpings*

(In Gross Tons)

	Sept. 16	Sept. 23
N. & W. Piers, Lamberts Pt.: Tons dumped for week.....	284,381	264,881
Virginian Piers, Sewalls Pt.: Tons dumped for week.....	154,640	164,492
C. & O. Piers, Newport News: Tons dumped for week.....	223,553	206,999

* Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

Pier and Bunker Prices, Gross Tons

PIERS			
	Sept. 16, 1926	Sept. 23, 1926†	
Pool 1, New York.....	\$5.35@5.60	\$5.85@5.60	
Pool 9, New York.....	5.00@5.15	5.00@5.15	
Pool 10, New York.....	4.90@5.10	4.95@5.15	
Pool 11, New York.....	4.35@4.50	4.40@4.50	
Pool 9, Philadelphia.....	4.85@5.20	5.00@5.25	
Pool 10, Philadelphia.....	4.60@4.85	4.70@4.90	
Pool 11, Philadelphia.....	4.30@4.55	4.40@4.60	
Pool 1, Hamp. Roads.....	5.40@5.50	5.75@5.85	
Pool 2, Hamp. Roads.....	5.30	5.50@5.60	
Pool 3, Hamp. Roads.....	5.00	4.75	
Pools 5-6-7, Hamp. Rds.	5.00@5.10	5.00@5.15	
BUNKERS			
Pool 1, New York.....	\$5.60@5.85	\$5.75@5.85	
Pool 9, New York.....	5.25@5.40	5.35@5.50	
Pool 10, New York.....	5.15@5.35	5.15@5.40	
Pool 11, New York.....	4.60@4.75	4.65@4.75	
Pool 9, Philadelphia.....	5.10@5.35	5.25@5.50	
Pool 10, Philadelphia.....	4.90@5.10	4.95@5.15	
Pool 11, Philadelphia.....	4.55@4.85	4.75@5.05	
Pool 1, Hamp. Roads.....	5.50	5.85	
Pool 2, Hamp. Roads.....	5.40	5.60	
Pools 5-6-7, Hamp. Rds.	5.10	5.15	

† Advances over previous week shown in heavy type; declines in italics.

Coming Meetings

Operators' Association of Williamson Field. Fall meeting Oct. 1 at Mountaineer Hotel, Williamson, W. Va. Secretary, George Bausewine, Jr., Williamson, W. Va.

American Society of Civil Engineers. Fall meeting, Bellevue-Stratford Hotel, Philadelphia, Pa., Oct. 4-9. Secretary, George T. Seabury, 29 West 39th St., New York City. Among the papers presented at this meeting will be one on coal-mine drainage by Andrew Crichton of Johnstown, Pa.

American Institute of Mining and Metallurgical Engineers. Oct. 6-9, at Pittsburgh, Pa. Secretary, H. Foster Bain, 29 West 39th St., New York City.

American Management Association. Annual meeting, Oct. 11-13, at Hotel Statler, Cleveland, Ohio. Managing director, W. J. Donald, 20 Vesey St., New York City.

Kanawha Coal Operators' Association. Annual meeting Oct. 15, Charleston, West Va. Secretary, D. C. Kennedy, Charleston, West Va.

Canadian Institute of Mining and Metallurgy. Eighth annual western meeting, held jointly with the northwest section of the American Institute of Mining and Metallurgical Engineers, second week in October, Spokane, Wash., and Cranbrook, B. C. Secretary, British Columbia Division, H. Mortimer-Lamb, Birks Bldg., Vancouver, B. C.

Illinois Coal Traffic Bureau. Annual meeting Oct. 28, Fisher Bldg., Chicago, Ill. Traffic Manager, W. Y. Wildman, Fisher Bldg., Chicago, Ill.

National Safety Council. Oct. 25-29, at Detroit, Mich. Managing director, W. H. Cameron, 108 East Ohio St., Chicago, Ill.

National Conference of Business Paper Editors. Annual convention at Hotel Astor, New York City, Nov. 8-10. Secretary, D. G. Woolf, 334 Fourth Ave., New York City.

Illinois Mining Institute. Annual meeting, Nov. 12 and 13 at Harrisburg, Ill. Edward Coulehan, superintendent, Saline County Coal Corp., Harrisburg, Ill., chairman of committee on arrangements.

National Industrial Traffic League. Commodore Hotel, New York City, Nov. 17 and 18. Executive secretary, J. W. Beek, Chicago, Ill.

American Welding Society. Fall meeting Nov. 17-19, Buffalo, N. Y. Secretary, M. M. Kelly, 29 W. 39th St., New York City.

American Society of Mechanical Engineers. Annual meeting, Engineering Societies Building, 29 W. 39th St., New York City, Dec. 6-9. Secretary, Calvin W. Rice, 29 W. 39th St., New York City.

Coal Mining Institute of America. Annual meeting, Chamber of Commerce, Pittsburgh, Pa., Dec. 8, 9 and 10. Secretary, H. D. Mason, Jr., Box 604, Ebensburg, Pa.

New Equipment

Tie Blocks Carry Weight of Furnace Wall

In these days of high-duty operation in the boiler plant, furnaces of comparatively large volume call for higher and thicker walls, imposing loads as high as 40 lb. per sq.in. on the firebrick. When to this are added the stresses due to lateral expansion and often the load of combustion arches and powdered-coal burners, in conjunction with high furnace temperatures, the results are such that it has been necessary for the manufacturer of firebrick to sacrifice refractoriness to obtain unusual load-bearing qualities.

To obviate this undesirable situation, the Chicago Fire Brick Co., 111 West Washington St., Chicago, Ill., has developed the "Chico" wall tie blocks to divide the firebrick lining into self-supporting sections and transfer the weight to the outer bearing wall of ordinary brick. With the usual proportion of nine courses of firebrick to one of tie blocks, shown in Fig. 1, the maximum compression on any brick does not exceed 1.7 lb. per sq.in., so that there is an ample factor of safety to give a choice to any type of brick preferred.

The blocks are made in one size and shape, with tongue-and-groove keys which interlock only when the blocks are staggered and in alignment. They are of the same length, but twice the width and thickness of the standard 9-in. firebrick, so that they are equivalent in volume to four bricks. The weight of each block is 29 lb.

It will be seen that every section of nine courses of brick and the attending course of tie blocks is self-supporting and independent of every other section, so that replacement at any particular location will not disturb the balance of the wall. The tie blocks extending to the fire face can be renewed as readily as the brick without disturbing the tie blocks extending into the setting wall. As the blocks carrying the load of a section are protected from the

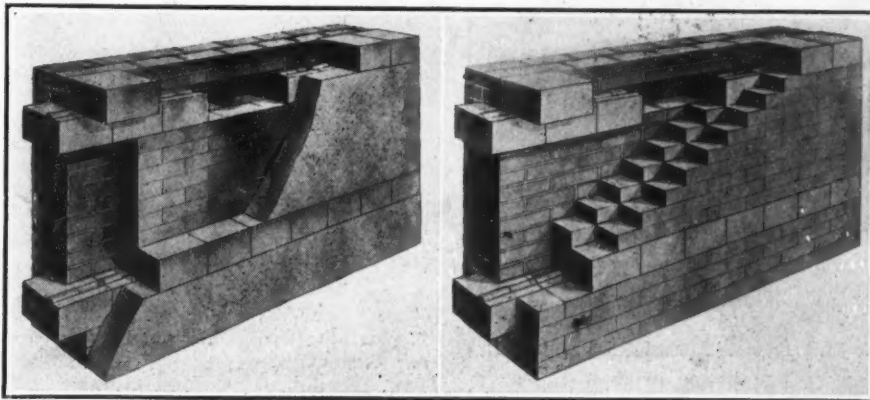
fire, they are not subjected to severe service and should remain in place indefinitely without disturbing the tie between the lining and the supporting wall of the furnace. For the latter purpose the blocks are preferable to firebrick, owing to their greater rigidity and shearing value.

Where it is desired to use plastic firebrick furnace lining, the construction shown in Fig. 2 is recommended. The tie blocks are used to divide the wall into sections, giving it greater stability and transferring the load to the common brick. As plastic refractory walls can be fired only from one side, the thickness has been limited to 4½ in. Experience has shown that this thickness of wall can be matured without danger.

New Direct-Acting Time-Limit Device for Circuit Breakers

An attachment for standard-type circuit breakers which will prevent the latter from opening until an abnormal current has existed for an unusual length of time, or where there is an overload of such high value as to be equivalent to a short-circuit, has been announced by the Roller-Smith Co., 233 Broadway, New York, N. Y. This direct-acting, time-limit attachment is designed especially for use where circuit breakers are used for motor protection because the starting current on the majority of motors is considerably in excess of the running current, thus necessitating the use of a circuit breaker which will not open during the normal starting period.

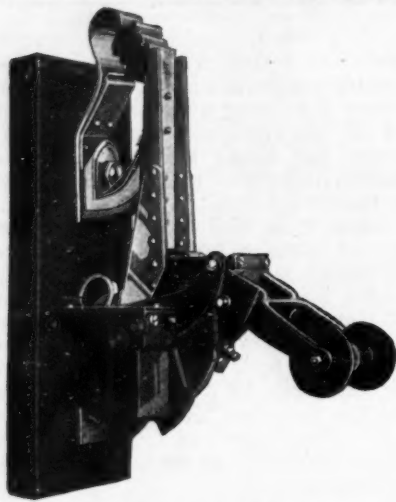
This attachment consists of paddles which are mounted in a cast, quadrant-shaped chamber filled with oil. The operation of the device is as follows: When the circuit in the overload coil of the breaker increases to the point where the magnetic pull of the core is sufficiently strong to attract the overload armature this armature is attracted upward in exactly the same fashion as



Wall Tie Blocks Support Firebrick Lining

Fig. 1 shows a wall with a firebrick lining with wall tie blocks each weighing 29 lb. which carry the weight to the main walls. Every ninth course these bricks replace the firebrick lining. Fig. 2 shows a wall with plastic firebrick lining and tie-block support.

on a regular breaker. The upward motion, however, is retarded by the suction which exists between the paddles. Because of the accurately ground surfaces of these two paddles and the fact that they are submerged in oil, a comparatively strong pull must be exerted



Circuit Breaker with Device

The attachment is easily secured to the outside housing of the outside poles on multiple-pole breakers by means of two bolts.

to separate them. If the pull of the overload core pin continues long enough or reaches a high point, due to a very heavy overload or short, the seal between the two paddles is broken and the armature rises, instantly driving the handle and lever over and thus tripping the breaker in the conventional manner.

Protects the Eyes When Inspecting the Fire

A new type of peep-hole door for boiler furnaces and oil stills has been put out recently by the Springfield Boiler Co., of Springfield, Ill. As shown in the illustration, the door consists of a square iron frame with a 5-in. round opening and a revolving shutter having



Helps Firebox Inspection

The illustration shows the peep-hole door in closed position. The device is easily installed on the fire or inspection door, or it may be placed on the brickwork without any serious changes in the refractory lining.

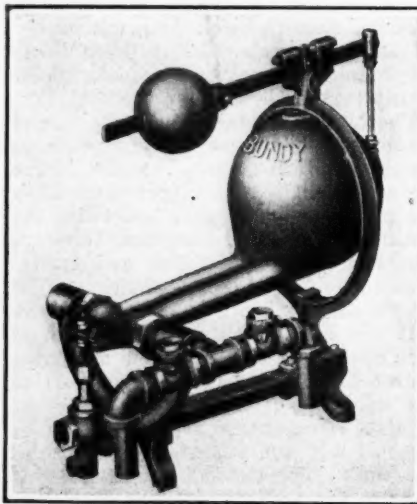
the three following positions: Closed, in which the opening is covered by an iron plate; inspection position, in which a specially colored glass covers the opening so that true conditions may be ascertained without glare or uncomfortable heat; third, the open position, allowing the insertion of a steam lance or slice bar.

Improved Steam Trap

Reduction in the number of parts and changes in design to eliminate packing and trunnion difficulties are among the improvements made to the line of steam traps manufactured by the Bundy Steam Trap Co., Nashua, N. H.

The bowl, pipes and elbows formed integrally are all in one casting, instead of five as formerly, a screw plug in the top of the bowl permitting access to the interior of the bowl for cleaning, etc.

To reduce the friction to the tilting motion as much as possible, the counterweight lever is suspended on a ball bearing, and the link between the bowl and the lever rocks on knife-edges in place of pins. The shock due to the bowl's tilting has been lessened by providing a cushion against which the lever attachment strikes at each tilting of the bowl. Another feature is the change



Designed for Simplicity

Troubles from leakage and binding at the trunnions in this trap have been reduced by the use of a liquid coupling, which together with a ground joint forms a self-forming packing.

made in the method of attaching the valve stem to the extensions of the bowl to facilitate adjustments.

The principle of operation and general design of the trap remains the same, the refinements just mentioned being made with a view to increasing the reliability and general utility of the trap. The trap is made in eight sizes ranging from $\frac{1}{4}$ to 3 in.

The General Refractories Co. of Philadelphia, Pa., announces a refractory cement composed of a chrome ore base free from sodium silicate and other low-fusing binders. It is said to have a high resistance to acids and basic slags, making it adaptable to the metallurgical industry as well as boiler settings and furnaces.

Industrial Notes

Reorganization of the general engineering department of the Westinghouse Electric & Mfg. Co. has been announced by H. W. Cope, assistant director of engineering. F. C. Hanker, has been made manager of central-station engineering; S. B. Cooper, manager of railway engineering; G. E. Stoltz, manager of industrial engineering, and W. E. Thau, manager of marine engineering. S. A. Staeger, formerly section engineer in charge of the paper-mill section, has been appointed industrial engineer giving particular attention to the paper-mill industry. Other appointments announced are: Central Station Engineering—C. A. Powel, engineer, generating-station engineering; R. D. Evans, engineer, transmission engineering, and C. A. Butcher, engineer, substation engineering. Railway Engineering—H. K. Smith, engineer, heavy traction engineering; G. M. Woods, engineer, light traction engineering, and A. H. Candee, engineer, gas-electric traction engineering. Industrial Engineering—E. M. Bouton, engineer, elevator engineering; C. W. Drake, engineer, general industrial engineering; C. T. Guildford, engineer, textile engineering; C. H. Matthews, engineer, mining engineering; O. Needham, engineer, steel mill engineering; J. W. Speer, engineer, material handling engineering; W. W. Spratt, engineer, paper mill engineering, and E. B. Dawson, engineer, electro-chemical and electro-metallurgical engineering. The appointment of N. W. Storer as consulting railway engineer in charge of the group handling of Diesel-electric locomotives and rail cars has been announced by R. S. Feicht, director of engineering.

Elliott & Co., of Pittsburgh, Pa., with plants in Jeannette, Pa.; Springfield, Ohio, and Wellsville, N. Y., has obtained control of the Ridgway Dynamo & Engine Co. The plant employs several hundred men, and extensive improvements and additions will be made at once. The sales force will be increased also. A. L. Bell, who has been president of the company, will remain in that capacity, and G. F. Elliott will be vice-president.

Charles J. Murray recently resigned from staff of the Linde Air Products Co., to become associated with the Oklahoma Contracting Co. He is now organizing a new division of that concern to engage exclusively in oxwelded pipe-line construction. During his association with the Linde company Mr. Murray specialized in this class of work and has studied the construction problems connected with a large number of notable trunk-line projects.

C. H. Johnson has been appointed engineer in the service department of the Timken Roller Bearing Co., Canton, Ohio. He will have direct charge of the installation of Timken bearings in automotive and industrial applications.

The Grant Sales Co., of Minneapolis, Minn., representatives of the Fibroc Insulation Co., manufacturers of Fibroc-Bakelite, has moved to new and larger quarters at 1004 Marquette Avenue.